



Open Source Used In Cloud Engineering Platform 1.0

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Text Part Number: 78EE117C99-181513818

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2.10 caseless 0.12.0

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2.14 co 4.6.0

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2.25 duplexer3 0.1.4

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2.28 escape-string-regexp 1.0.5

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2.29 extend 3.0.2

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2.30 extsprintf 1.3.0

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2.31 fast-deep-equal 1.0.0

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2.32 fast-json-stable-stringify 2.0.0

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2.33 filereader 0.10.3

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2.34 follow-redirects 1.5.1

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2.35 foreachasync 3.0.0

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2.39 get-stream 3.0.0

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2.40 getpass 0.1.7

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2.41 got 7.1.0

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2.42 har-schema 2.0.0

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2.43 har-validator 5.1.0

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2.44 has-flag 3.0.0

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2.47 http-signature 1.2.0

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2.49 is-object 1.0.1

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2.56 jquery 3.3.1

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2.58 json-schema 0.2.3

2.59 json-schema-traverse 0.3.1

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2.61 jsprim 1.4.1

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2.90 timed-out 4.0.1

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2.92 tunnel-agent 0.6.0

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2.94 url-parse-lax 1.0.0

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```

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3.3 bumpversion 0.5.3

3.4 celery 4.2.1

3.4.1 Available under license :

Every contribution to Celery is as important to us, as every coin in the money bin is to Scrooge McDuck.

The first commit to the Celery codebase was made on Fri Apr 24 13:30:00 2009 +0200, and has since then been improved by many contributors.

Everyone who have ever contributed to Celery should be in this list, but in a recent policy change it has been decided that everyone must add themselves here, and not be added by others, so it's currently incomplete waiting for everyone to add their names.

The list of authors added before the policy change can be found in docs/AUTHORS.txt.

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3.6 coverage 4.5.1

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3.16 pylint 2.1.0

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3.17 pymongo 3.7.1

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ISO C9x compliantstdint.h for Microsoft Visual Studio
Based on ISO/IEC 9899:TC2 Committee draft (May 6, 2005) WG14/N1124

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3.19 pytest-runner 4.2

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3.20 python-dateutil 2.7.3

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3.22 redis 2.10.6

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3.23 requests 2.19.1

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```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

```
<html xmlns="http://www.w3.org/1999/xhtml">  
<head>  
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />  
  
  <title>
```

Appendix: Copyright
—
SQLAlchemy 1.2 Documentation

```
</title>
```

```
<!-- begin iterate through SQLA + sphinx environment css_files -->  
  <link rel="stylesheet" href="_static/pygments.css" type="text/css" />  
  <link rel="stylesheet" href="_static/docs.css" type="text/css" />  
  <link rel="stylesheet" href="_static/changelog.css" type="text/css" />  
  <link rel="stylesheet" href="_static/sphinx_paramlinks.css" type="text/css" />  
<!-- end iterate through SQLA + sphinx environment css_files -->
```

```
<!-- begin layout.mako headers -->
```

```
<link rel="index" title="Index" href="genindex.html" />  
<link rel="search" title="Search" href="search.html" />  
  <link rel="copyright" title="Copyright" href="#" />  
<link rel="top" title="SQLAlchemy 1.2 Documentation" href="index.html" />  
<!-- end layout.mako headers -->
```

```
</head>
```

```
<body>
```

```
<div id="docs-container">
```

```
<div id="docs-top-navigation-container" class="body-background">
```

```
<div id="docs-header">
```

```
<div id="docs-version-header">
```

```
  Release: <span class="version-num">1.2.10</span>
```

```
  | Release Date: July 13, 2018
```

```
</div>
```

```
<h1>SQLAlchemy 1.2 Documentation</h1>
```

```
</div>
```

```
</div>
```

```
<div id="docs-body-container">
```

```
<div id="fixed-sidebar" class="withsidebar">
```

```
<div id="docs-sidebar-popout">
```

```
<h3><a href="index.html">SQLAlchemy 1.2 Documentation</a></h3>
```

```
<p id="sidebar-topnav">
```

```
<a href="contents.html">Contents</a> |
```

```
<a href="genindex.html">Index</a>
```

</p>

```
<div id="sidebar-search">
  <form class="search" action="search.html" method="get">
    <label>
      Search terms:
    </label>
    <input type="text" placeholder="search..." name="q" size="12" />
    </label>
    <input type="hidden" name="check_keywords" value="yes" />
    <input type="hidden" name="area" value="default" />
  </form>
</div>
```

</div>

```
<div id="docs-sidebar">
```

```
<div id="sidebar-banner">
```

</div>

```
<div id="docs-sidebar-inner">
```

```
<h3>
```

```
<a href="index.html" title="SQLAlchemy 1.2 Documentation">SQLAlchemy 1.2 Documentation</a>
```

```
</h3>
```

```
<ul>
```

```
<li><span class="link-container first"><a class="reference external" href="intro.html">Overview</a></span></li>
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<li><span class="link-container first"><a class="reference external" href="orm/index.html">SQLAlchemy
ORM</a></span></li>
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<li><span class="link-container first"><a class="reference external" href="core/index.html">SQLAlchemy
Core</a></span></li>
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<li><span class="link-container first"><a class="reference external"
href="dialects/index.html">Dialects</a></span></li>
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<li><span class="link-container first"><a class="reference external" href="faq/index.html">Frequently Asked
Questions</a></span></li>
```

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<li><span class="link-container first"><a class="reference external" href="errors.html">Error
Messages</a></span></li>
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<li><span class="link-container first"><a class="reference external" href="changelog/index.html">Changes and
Migration</a></span></li>
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3.29 watchdog 0.8.3

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3.30 wheel 0.31.1

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Data model artifacts for Prometheus.

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THE SOFTWARE.

import: ../../../../fossene/db/schema/thing.yml

fields:

site: string

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4.4 consul-template 0.18.1

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4.6 curl 7.19.7

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krb4

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4.7 curl 7.35

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```
/******
```

```
*  
* This example source code introduces a c library buffered I/O interface to  
* URL reads it supports fopen(), fread(), fgets(), feof(), fclose(),  
* rewind(). Supported functions have identical prototypes to their normal c  
* lib namesakes and are preceeded by url_ .  
*  
* Using this code you can replace your program's fopen() with url_fopen()  
* and fread() with url_fread() and it become possible to read remote streams  
* instead of (only) local files. Local files (ie those that can be directly  
* fopened) will drop back to using the underlying clib implementations  
*  
* See the main() function at the bottom that shows an app that retrives from a  
* specified url using fgets() and fread() and saves as two output files.  
*  
* Copyright (c) 2003 Simtec Electronics  
*  
* Re-implemented by Vincent Sanders <vince@kyllikki.org> with extensive  
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*  
* This example requires libcurl 7.9.7 or later.  
*/
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4.8 curl/apache-portions 7.35

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4.10 docker 17.03.1

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Go support for Protocol Buffers - Google's data interchange format

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Support for streaming Protocol Buffer messages for the Go language (golang).

https://github.com/matttproud/golang_protobuf_extensions

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Gocheck - A rich testing framework for Go

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*/
```

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 */
```

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```

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```

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```

```
*
```

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```
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Elasticsearch X-Pack
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```

import org.elasticsearch.gradle.test.ClusterConfiguration
import org.elasticsearch.gradle.test.ClusterFormationTasks
import org.elasticsearch.gradle.test.NodeInfo

apply plugin: 'elasticsearch.standalone-test'
apply plugin: 'elasticsearch.standalone-rest-test'
apply plugin: 'elasticsearch.rest-test'

dependencies {
    testCompile project(path: ':modules:tribe', configuration: 'runtime')
    testCompile project(path: xpackProject('plugin').path, configuration: 'testArtifacts')

    // TODO: remove all these test deps, this is completely bogus, guava is being force upgraded
    testCompile project(path: xpackModule('deprecation'), configuration: 'runtime')
    testCompile project(path: xpackModule('graph'), configuration: 'runtime')
    testCompile project(path: xpackModule('logstash'), configuration: 'runtime')
    testCompile project(path: xpackModule('ml'), configuration: 'runtime')
    testCompile project(path: xpackModule('monitoring'), configuration: 'runtime')
    testCompile project(path: xpackModule('security'), configuration: 'runtime')
    testCompile project(path: xpackModule('upgrade'), configuration: 'runtime')
    testCompile project(path: xpackModule('watcher'), configuration: 'runtime')
    testCompile project(path: xpackModule('core'), configuration: 'testArtifacts')
    testCompile project(path: xpackModule('monitoring'), configuration: 'testArtifacts')
}

compileTestJava.options.compilerArgs << "-Xlint:-rawtypes,-unchecked"
namingConventions.skipIntegTestInDisguise = true

test {
    /*
    * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
    will step on each
    * other if we allow them to set the number of available processors as it's set-once in Netty.
    */
    systemProperty 'es.set.netty.runtime.available.processors', 'false'
    include '**/*Tests.class'
}

String licensePath = xpackProject('license-tools').projectDir.toPath().resolve('src/test/resources').toString()
sourceSets {
    test {
        resources {
            srcDirs += [licensePath]
        }
    }
}

project.forbiddenPatterns {

```

```
exclude '**/*.key'
}
```

```
task setupClusterOne {}
ClusterConfiguration cluster1Config = new ClusterConfiguration(project)
cluster1Config.clusterName = 'cluster1'
cluster1Config.setting('node.name', 'cluster1-node1')
// x-pack
cluster1Config.setting('xpack.monitoring.enabled', false)
cluster1Config.setting('xpack.security.enabled', false)
cluster1Config.setting('xpack.watcher.enabled', false)
cluster1Config.setting('xpack.graph.enabled', false)
cluster1Config.setting('xpack.ml.enabled', false)
```

```
List<NodeInfo> cluster1Nodes = ClusterFormationTasks.setup(project, 'clusterOne', setupClusterOne,
cluster1Config)
```

```
task setupClusterTwo {}
ClusterConfiguration cluster2Config = new ClusterConfiguration(project)
cluster2Config.clusterName = 'cluster2'
cluster2Config.setting('node.name', 'cluster2-node1')
// x-pack
cluster2Config.setting('xpack.monitoring.enabled', false)
cluster2Config.setting('xpack.monitoring.enabled', false)
cluster2Config.setting('xpack.security.enabled', false)
cluster2Config.setting('xpack.watcher.enabled', false)
cluster2Config.setting('xpack.graph.enabled', false)
cluster2Config.setting('xpack.ml.enabled', false)
```

```
List<NodeInfo> cluster2Nodes = ClusterFormationTasks.setup(project, 'clusterTwo', setupClusterTwo,
cluster2Config)
```

```
integTestCluster {
dependsOn setupClusterOne, setupClusterTwo
setting 'node.name', 'tribe-node'
setting 'tribe.on_conflict', 'prefer_cluster1'
setting 'tribe.cluster1.cluster.name', 'cluster1'
setting 'tribe.cluster1.discovery.zen.ping.unicast.hosts', "'${-> cluster1Nodes.get(0).transportUri()}'"
setting 'tribe.cluster1.http.enabled', 'true'
setting 'tribe.cluster1.http.port', '0'
setting 'tribe.cluster1.transport.tcp.port', '0'
setting 'tribe.cluster1.xpack.monitoring.enabled', false
setting 'tribe.cluster1.xpack.monitoring.enabled', false
setting 'tribe.cluster1.xpack.security.enabled', false
setting 'tribe.cluster1.xpack.watcher.enabled', false
setting 'tribe.cluster1.xpack.graph.enabled', false
setting 'tribe.cluster1.xpack.ml.enabled', false
setting 'tribe.cluster1.xpack.license.self_generated.type', 'trial'
```

```

setting 'tribe.cluster2.cluster.name', 'cluster2'
setting 'tribe.cluster2.discovery.zen.ping.unicast.hosts', ""${-> cluster2Nodes.get(0).transportUri()}""
setting 'tribe.cluster2.http.enabled', 'true'
setting 'tribe.cluster1.http.port', '0'
setting 'tribe.cluster1.transport.tcp.port', '0'
setting 'tribe.cluster2.xpack.monitoring.enabled', false
setting 'tribe.cluster2.xpack.monitoring.enabled', false
setting 'tribe.cluster2.xpack.security.enabled', false
setting 'tribe.cluster2.xpack.watcher.enabled', false
setting 'tribe.cluster2.xpack.graph.enabled', false
setting 'tribe.cluster2.xpack.ml.enabled', false
setting 'tribe.cluster2.xpack.license.self_generated.type', 'trial'
// x-pack
setting 'xpack.monitoring.enabled', false
setting 'xpack.monitoring.enabled', false
setting 'xpack.security.enabled', false
setting 'xpack.watcher.enabled', false
setting 'xpack.graph.enabled', false
setting 'xpack.ml.enabled', false
setting 'xpack.license.self_generated.type', 'trial'
waitCondition = { node, ant ->
    File tmpFile = new File(node.cwd, 'wait.success')
    // 5 nodes: tribe + clusterOne (1 node + tribe internal node) + clusterTwo (1 node + tribe internal node)
    ant.get(src: "http://${node.httpUri()}/_cluster/health?wait_for_nodes=>=5&wait_for_status=yellow",
        dest: tmpFile.toString(),
        ignoreerrors: true,
        retries: 10)
    return tmpFile.exists()
}
}

integTestRunner {
    /*
    * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
    will step on each
    * other if we allow them to set the number of available processors as it's set-once in Netty.
    */
    systemProperty 'es.set.netty.runtime.available.processors', 'false'
    systemProperty 'tests.cluster', ""${-> cluster1Nodes.get(0).transportUri()}""
    systemProperty 'tests.cluster2', ""${-> cluster2Nodes.get(0).transportUri()}""
    systemProperty 'tests.tribe', ""${-> integTest.nodes.get(0).transportUri()}""
    finalizedBy 'clusterOne#stop'
    finalizedBy 'clusterTwo#stop'
}
/*
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```



```

*/
package org.elasticsearch.test;

import org.elasticsearch.Build;
import org.elasticsearch.common.bytes.ByteArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.GetLicenseResponse;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicensesStatus;
import org.elasticsearch.license.LicensingClient;
import org.elasticsearch.license.PutLicenseResponse;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.AfterClass;

import java.io.IOException;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.URL;
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;

import static org.hamcrest.CoreMatchers.equalTo;

public class LicensingTribeIT extends ESIntegTestCase {
    private static TestCluster cluster2;
    private static TestCluster tribeNode;

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Collections.singletonList(XPackPlugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    public void setUp() throws Exception {
        super.setUp();
        if (cluster2 == null) {
            cluster2 = buildExternalCluster(System.getProperty("tests.cluster2"));
        }
    }
}

```

```

    }
    if (tribeNode == null) {
        tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
    }
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    Settings.Builder builder = Settings.builder();
    builder.put(super.nodeSettings(nodeOrdinal));
    return builder.build();
}

@AfterClass
public static void tearDownExternalClusters() throws IOException {
    if (cluster2 != null) {
        try {
            cluster2.close();
        } finally {
            cluster2 = null;
        }
    }
    if (tribeNode != null) {
        try {
            tribeNode.close();
        } finally {
            tribeNode = null;
        }
    }
}

@Override
protected Settings externalClusterClientSettings() {
    Settings.Builder builder = Settings.builder();
    builder.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
    builder.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
    builder.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
    builder.put(XPackSettings.GRAPH_ENABLED.getKey(), false);
    builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false);
    return builder.build();
}

private ExternalTestCluster buildExternalCluster(String clusterAddresses) throws IOException {
    String[] stringAddresses = clusterAddresses.split(",");
    TransportAddress[] transportAddresses = new TransportAddress[stringAddresses.length];
    int i = 0;
    for (String stringAddress : stringAddresses) {
        URL url = new URL("http://" + stringAddress);
    }
}

```

```

        InetAddress inetAddress = InetAddress.getByName(url.getHost());
        transportAddresses[i++] = new TransportAddress(new InetSocketAddress(inetAddress, url.getPort()));
    }
    return new ExternalTestCluster(createTempDir(), externalClusterClientSettings(), transportClientPlugins(),
transportAddresses);
}

public void testLicensePropagateToTribeNode() throws Exception {
    assumeTrue("License is only valid when tested against snapshot/test keys", Build.CURRENT.isSnapshot());
    // test that auto-generated basic license propagates to tribe
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals("operationMode()", getLicenseResponse.license().operationMode(), License.OperationMode.BASIC);
    });

    // test that signed license with higher operation mode takes precedence
    LicensingClient cluster2Client = new LicensingClient(cluster2.client());
    PutLicenseResponse licenseResponse = cluster2Client
        .preparePutLicense(License.fromSource(new
ByteArray(PLATINUM_LICENSE.getBytes(StandardCharsets.UTF_8)), XContentType.JSON))
        .setAcknowledged(true).get();
    assertEquals("isAcknowledged()", licenseResponse.isAcknowledged(), true);
    assertEquals("status()", licenseResponse.status(), LicensesStatus.VALID);
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals("operationMode()", getLicenseResponse.license().operationMode(), License.OperationMode.PLATINUM);
    });

    // test removing signed license falls back works
    assertTrue("cluster2Client.prepareDeleteLicense().get().isAcknowledged()",
cluster2Client.prepareDeleteLicense().get().isAcknowledged());
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals("operationMode()", getLicenseResponse.license().operationMode(), License.OperationMode.BASIC);
    });
}

public void testDummy() throws Exception {
    // this test is here so that testLicensePropagateToTribeNode's assumption
    // doesn't result in this test suite to have no tests run and trigger a build failure
}

private static final String PLATINUM_LICENSE = "{\"license\":{\"uid\":\"1\",\"type\":\"platinum\"},\" +

```

```

        "\issue_date_in_millis\":1411948800000,\"expiry_date_in_millis\":1914278399999,\"max_nodes\":1,\" +
        "\issued_to\": \"issuedTo\", \"issuer\": \"issuer\", \" +
        \"signature\": \"AAAAAwAAAA2hWlkvKcxQIpdVWdCtAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxO
        WpSbTVoMVZwUzRxVk1\" +
        \"PSmkxakxZdW5IMlhTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZ
        SQi9iNmRQNkw1SlpLN0I\" +
        \"DalZCS095MXRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBY
        WnpoZEphZHBEZjUrTVB\" +
        \"xRENNsXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmU
        k9QVzhFeTFoM1Q0RnJXSG5\" +
        \"3MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZI
        WEtaSU9wTTJENDVvT1NCYkla\" +
        \"cUYyK2FwRW9xa0t6ldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdEN
        GWFRreXNKNkE9PQAAAQBWg\" +
        \"u3yZp0KOBG//92X4YVmau3P5asvx0FAPDX2Ze734Tap/nc30X6Rt4yEEem+6bCQr/ibBOqWboJKRbbTZLBQfY
        FmL1ZqvAY3bJJ1/Xs\" +
        \"8NyDfxKGztlUt/IIOzHPzxs0f8Bv4OJeK48vjovWaDc1Vmo4n1SGyyL0JcEbOWC6A3U3mBsWn7wLUe+hW9+
        akVAYOO5Tlcm60ub7k\" +
        \"H/LIZNOhvGglSVDbl3p8EBkNMy0CV7urQ0wdG1nLcNvf8/BiT15lC5nLrM9Dt5w3pziPIASzw4iksW/CzvYy5
        tjOoWKEEnxi2EZOB\" +
        \"9dKyT4mTdvyBOrTHLdgr4lmHd3qYAEgcTCaQ\", \"start_date_in_millis\":-1}}\";
    }
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.plugins.PluginInfo;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.monitoring.test.MonitoringIntegTestCase;

import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Collection;
import java.util.function.Function;

```

```

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = TEST, transportClientRatio = 0, numClientNodes = 0, numDataNodes = 0)
public class MonitoringPluginTests extends MonitoringIntegTestCase {

    public MonitoringPluginTests() throws Exception {
        super();
    }

    @Override
    protected void startMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected void stopMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected boolean addTestZenDiscovery() {
        return false;
    }

    public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

        public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
            super(settings);
        }

        @Override
        public Settings additionalSettings() {
            if (settings.getGroups("tribe", true).isEmpty()) {
                return super.additionalSettings();
            } else {
                return Settings.EMPTY;
            }
        }
    }

    public static class MockTribePlugin extends TribePlugin {

        public MockTribePlugin(Settings settings) {
            super(settings);
        }

        protected Function<Settings, Node> nodeBuilder(Path configPath) {

```

```

        return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
    }

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    return plugins;
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put(MonitoringService.INTERVAL.getKey(), "-1")
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
        .build();
}

@Override
protected Settings transportClientSettings() {
    return Settings.builder()
        .put(super.transportClientSettings())
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .build();
}

public void testMonitoringEnabled() {
    internalCluster().startNode(Settings.builder()
        .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
        .build());
    assertPluginIsLoaded();
    assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabled() {
    internalCluster().startNode(Settings.builder()
        .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
        .build());
    assertPluginIsLoaded();
    assertServiceIsNotBound(MonitoringService.class);
}

public void testMonitoringEnabledOnTribeNode() {

```

```

internalCluster().startNode(Settings.builder()
    .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
    .put("tribe.name", "t1")
    .build());
assertPluginIsLoaded();
assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabledOnTribeNode() {
    internalCluster().startNode(Settings.builder().put("tribe.name", "t1").build());
    assertPluginIsLoaded();
    assertServiceIsNotBound(MonitoringService.class);
}

private void assertPluginIsLoaded() {
    NodesInfoResponse response = client().admin().cluster().prepareNodesInfo().setPlugins(true).get();
    for (NodeInfo nodeInfo : response.getNodes()) {
        assertNotNull(nodeInfo.getPlugins());

        boolean found = false;
        for (PluginInfo plugin : nodeInfo.getPlugins().getPluginInfos()) {
            assertNotNull(plugin);

            if (LocalStateMonitoring.class.getName().equals(plugin.getName())) {
                found = true;
                break;
            }
        }
        assertThat("xpack plugin not found", found, equalTo(true));
    }
}

private void assertServiceIsBound(Class<?> klass) {
    try {
        Object binding = internalCluster().getDataNodeInstance(klass);
        assertNotNull(binding);
        assertTrue(klass.isInstance(binding));
    } catch (Exception e) {
        fail("no service bound for class " + klass.getSimpleName());
    }
}

private void assertServiceIsNotBound(Class<?> klass) {
    try {
        // it should be bound, but directly as null
        assertNull(internalCluster().getDataNodeInstance(klass));
    } catch (Exception ce) {
        assertThat("message contains error about missing implementation: " + ce.getMessage(),

```

```

        ce.getMessage().contains("Could not find a suitable constructor"), equalTo(true));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.client.Client;
import org.elasticsearch.license.TribeTransportTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkAction;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkRequest;

import java.util.Collections;
import java.util.List;

public class MonitoringTribeTests extends TribeTransportTestCase {

    @Override
    protected List<String> enabledFeatures() {
        return Collections.singletonList(XPackField.MONITORING);
    }

    @Override
    protected void verifyActionOnClientNode(Client client) throws Exception {
        assertMonitoringTransportActionsWorks(client);
    }

    @Override
    protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
        assertMonitoringTransportActionsWorks(masterClient);
    }

    @Override
    protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
        assertMonitoringTransportActionsWorks(dataNodeClient);
    }

    private static void assertMonitoringTransportActionsWorks(Client client) throws Exception {
        client.execute(MonitoringBulkAction.INSTANCE, new MonitoringBulkRequest());
    }

    @Override
    protected void verifyActionOnTribeNode(Client tribeClient) {

```



```

        failAction(tribeClient, MonitoringBulkAction.INSTANCE);
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.LicenseService;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.ssl.SSLService;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;

public class CompositeTestingXPackPlugin extends LocalStateCompositeXPackPlugin {

    public CompositeTestingXPackPlugin(final Settings settings, final Path configPath) throws Exception {
        super(settings, configPath);
        CompositeTestingXPackPlugin thisVar = this;
        plugins.add(new Deprecation());
        plugins.add(new Graph(settings));
        plugins.add(new Logstash(settings));
        plugins.add(new MachineLearning(settings, configPath) {
            @Override
            protected XPackLicenseState getLicenseState() {
                return super.getLicenseState();
            }
        });
        plugins.add(new Monitoring(settings) {
            @Override
            protected SSLService getSslService() {
                return thisVar.getSslService();
            }
        }

        @Override
        protected LicenseService getLicenseService() {
            return thisVar.getLicenseService();
        }
    }
}

```

```

    }

    @Override
    protected XPackLicenseState getLicenseState() {
        return thisVar.getLicenseState();
    }
});
plugins.add(new Watcher(settings) {
    @Override
    protected SSLService getSslService() {
        return thisVar.getSslService();
    }

    @Override
    protected XPackLicenseState getLicenseState() {
        return thisVar.getLicenseState();
    }
});
plugins.add(new Security(settings, configPath) {
    @Override
    protected SSLService getSslService() { return thisVar.getSslService(); }

    @Override
    protected XPackLicenseState getLicenseState() { return thisVar.getLicenseState(); }
});
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.client.Client;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.license.TestUtils.generateSignedLicense;

public class LicenseTribeTests extends TribeTransportTestCase {

    @Override
    protected void verifyActionOnClientNode(Client client) throws Exception {
        assertLicenseTransportActionsWorks(client);
    }

    @Override
    protected void verifyActionOnMasterNode(Client masterClient) throws Exception {

```

```

    assertLicenseTransportActionsWorks(masterClient);
}

@Override
protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
    assertLicenseTransportActionsWorks(dataNodeClient);
}

private static void assertLicenseTransportActionsWorks(Client client) throws Exception {
    client.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
    client.execute(PutLicenseAction.INSTANCE, new PutLicenseRequest()
        .license(generateSignedLicense(TimeValue.timeValueHours(1))));
    client.execute>DeleteLicenseAction.INSTANCE, new>DeleteLicenseRequest());
}

@Override
protected void verifyActionOnTribeNode(Client tribeClient) throws Exception {
    // The get licence action should work, but everything else should fail
    tribeClient.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
    failAction(tribeClient, PutLicenseAction.INSTANCE);
    failAction(tribeClient,>DeleteLicenseAction.INSTANCE);
}
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Requests;
import org.elasticsearch.cluster.health.ClusterHealthStatus;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.Priority;
import org.elasticsearch.common.UUIDs;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.discovery.zen.UnicastZenPing;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;

```

```

import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.ESIntegTestCase.Scope;
import org.elasticsearch.test.InternalTestCluster;
import org.elasticsearch.test.NodeConfigurationSource;
import org.elasticsearch.test.TestCluster;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.CompositeTestingXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.core.ml.MachineLearningField;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.upgrade.Upgrade;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;
import java.util.Collections;
import java.util.List;
import java.util.function.Function;

import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertAcked;
import static org.hamcrest.Matchers.anyOf;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = Scope.TEST, transportClientRatio = 0, numClientNodes = 1, numDataNodes = 2)
public abstract class TribeTransportTestCase extends ESIntegTestCase {

    protected List<String> enabledFeatures() {
        return Collections.emptyList();
    }

    @Override
    protected final Settings nodeSettings(int nodeOrdinal) {
        final Settings.Builder builder = Settings.builder()

```

```

        .put(NetworkModule.HTTP_ENABLED.getKey(), false)
        .put("transport.type", getTestTransportType());
    List<String> enabledFeatures = enabledFeatures();
    builder.put(XPackSettings.SECURITY_ENABLED.getKey(),
enabledFeatures.contains(XPackField.SECURITY));
    builder.put(XPackSettings.MONITORING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MONITORING));
    builder.put(XPackSettings.WATCHER_ENABLED.getKey(),
enabledFeatures.contains(XPackField.WATCHER));
    builder.put(XPackSettings.GRAPH_ENABLED.getKey(), enabledFeatures.contains(XPackField.GRAPH));
    builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MACHINE_LEARNING));
    builder.put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false);
    return builder.build();
}

@Override
protected boolean ignoreExternalCluster() {
    return true;
}

@Override
protected boolean addTestZenDiscovery() {
    return false;
}

public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

    public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
        super(settings);
    }

    @Override
    public Settings additionalSettings() {
        if (settings.getGroups("tribe", true).isEmpty()) {
            return super.additionalSettings();
        } else {
            return Settings.EMPTY;
        }
    }
}

public static class MockTribePlugin extends TribePlugin {

    public MockTribePlugin(Settings settings) {
        super(settings);
    }
}

```

```

protected Function<Settings, Node> nodeBuilder(Path configPath) {
    return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
}

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    plugins.add(CompositeTestingXPackPlugin.class);
    plugins.add(CommonAnalysisPlugin.class);
    return plugins;
}

@Override
protected final Collection<Class<? extends Plugin>> transportClientPlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    plugins.add(XPackClientPlugin.class);
    plugins.add(CommonAnalysisPlugin.class);
    return plugins;
}

public void testTribeSetup() throws Exception {
    NodeConfigurationSource nodeConfigurationSource = new NodeConfigurationSource() {
        @Override
        public Settings nodeSettings(int nodeOrdinal) {
            return TribeTransportTestCase.this.nodeSettings(nodeOrdinal);
        }

        @Override
        public Path nodeConfigPath(int nodeOrdinal) {
            return null;
        }

        @Override
        public Collection<Class<? extends Plugin>> nodePlugins() {
            return TribeTransportTestCase.this.nodePlugins();
        }

        @Override
        public Settings transportClientSettings() {
            return TribeTransportTestCase.this.transportClientSettings();
        }

        @Override

```

```

    public Collection<Class<? extends Plugin>> transportClientPlugins() {
        return TribeTransportTestCase.this.transportClientPlugins();
    }
};
final InternalTestCluster cluster2 = new InternalTestCluster(
    randomLong(), createTempDir(), true, true, 2, 2,
    UUIDs.randomBase64UUID(random()), nodeConfigurationSource, 1, false, "tribe_node2",
    getMockPlugins(), getClientWrapper());

cluster2.beforeTest(random(), 0.0);

logger.info("create 2 indices, test1 on t1, and test2 on t2");
assertAcked(internalCluster().client().admin().indices().prepareCreate("test1").get());
assertAcked(cluster2.client().admin().indices().prepareCreate("test2").get());
ensureYellow(internalCluster());
ensureYellow(cluster2);
//   Map<String,String> asMap = internalCluster().getDefaultSettings().getAsMap();
Settings.Builder tribe1Defaults = Settings.builder();
Settings.Builder tribe2Defaults = Settings.builder();
internalCluster().getDefaultSettings().keySet().forEach(k -> {
    if (k.startsWith("path.") == false) {
        tribe1Defaults.copy(k, internalCluster().getDefaultSettings());
        tribe2Defaults.copy(k, internalCluster().getDefaultSettings());
    }
});
tribe1Defaults.normalizePrefix("tribe.t1.");
tribe2Defaults.normalizePrefix("tribe.t2.");
// give each tribe it's unicast hosts to connect to
tribe1Defaults.putList("tribe.t1." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(internalCluster().client()));
tribe1Defaults.putList("tribe.t2." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(cluster2.client()));

Settings merged = Settings.builder()
    .put("tribe.t1.cluster.name", internalCluster().getClusterName())
    .put("tribe.t2.cluster.name", cluster2.getClusterName())
    .put("tribe.t1.transport.tcp.port", 0)
    .put("tribe.t2.transport.tcp.port", 0)
    .put("tribe.t1.transport.type", getTestTransportType())
    .put("tribe.t2.transport.type", getTestTransportType())
    .put("tribe.blocks.write", false)
    .put(tribe1Defaults.build())
    .put(tribe2Defaults.build())
    .put(NetworkModule.HTTP_ENABLED.getKey(), false)
    .put(internalCluster().getDefaultSettings())
    .put(XPackSettings.SECURITY_ENABLED.getKey(), false) // otherwise it conflicts with mock transport

```

```

        .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
        .put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
        .put("tribe.t1." + XPackSettings.SECURITY_ENABLED.getKey(), false)
        .put("tribe.t2." + XPackSettings.SECURITY_ENABLED.getKey(), false)
        .put("tribe.t1." + XPackSettings.WATCHER_ENABLED.getKey(), false)
        .put("tribe.t2." + XPackSettings.WATCHER_ENABLED.getKey(), false)
        .put("tribe.t1." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
        .put("tribe.t2." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
        .put("tribe.t1." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
        .put("tribe.t2." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
        .put("node.name", "tribe_node") // make sure we can identify threads from this node
        .put("transport.type", getTestTransportType())
        .build();

    final List<Class<? extends Plugin>> mockPlugins = Arrays.asList(MockTribePlugin.class,
TribeAwareTestZenDiscoveryPlugin.class,
        getTestTransportPlugin(), Deprecation.class, Graph.class, Logstash.class, MachineLearning.class,
Monitoring.class,
        Security.class, Upgrade.class, Watcher.class, XPackPlugin.class);
    final Node tribeNode = new MockNode(merged, mockPlugins).start();
    Client tribeClient = tribeNode.client();

    logger.info("wait till tribe has the same nodes as the 2 clusters");
    assertBusy(() -> {
        DiscoveryNodes tribeNodes = tribeNode.client().admin().cluster().prepareState().get().getState().getNodes();
        assertThat(countDataNodesForTribe("t1", tribeNodes),
            equalTo(internalCluster().client().admin().cluster().prepareState().get().getState()
                .getNodes().getDataNodes().size()));
        assertThat(countDataNodesForTribe("t2", tribeNodes),
            equalTo(cluster2.client().admin().cluster().prepareState().get().getState()
                .getNodes().getDataNodes().size()));
    });
    logger.info("--> verify transport actions for tribe node");
    verifyActionOnTribeNode(tribeClient);
    logger.info("--> verify transport actions for data node");
    verifyActionOnDataNode((randomBoolean() ? internalCluster() : cluster2).dataNodeClient());
    logger.info("--> verify transport actions for master node");
    verifyActionOnMasterNode((randomBoolean() ? internalCluster() : cluster2).masterClient());
    logger.info("--> verify transport actions for client node");
    verifyActionOnClientNode((randomBoolean() ? internalCluster() : cluster2).coordOnlyNodeClient());
    try {
        cluster2.wipe(Collections.<String>emptySet());
    } finally {
        cluster2.afterTest();
    }
    tribeNode.close();
    cluster2.close();
}

```



```

/**
 * Verify transport action behaviour on client node
 */
protected abstract void verifyActionOnClientNode(Client client) throws Exception;

/**
 * Verify transport action behaviour on master node
 */
protected abstract void verifyActionOnMasterNode(Client masterClient) throws Exception;

/**
 * Verify transport action behaviour on data node
 */
protected abstract void verifyActionOnDataNode(Client dataNodeClient) throws Exception;

/**
 * Verify transport action behaviour on tribe node
 */
protected abstract void verifyActionOnTribeNode(Client tribeClient) throws Exception;

protected void failAction(Client client, Action action) {
    try {
        client.execute(action, action.newRequestBuilder(client).request());
        fail("expected [" + action.name() + "] to fail");
    } catch (IllegalStateException e) {
        assertThat(e.getMessage(), containsString("failed to find action"));
    }
}

private void ensureYellow(TestCluster testCluster) {
    ClusterHealthResponse actionGet = testCluster.client().admin().cluster()
        .health(Requests.clusterHealthRequest().waitForYellowStatus()
            .waitForEvents(Priority.LANGUID).waitForNoRelocatingShards(true)).actionGet();
    if (actionGet.isTimedOut()) {
        logger.info("ensureGreen timed out, cluster state:\n{ }\n{ }", testCluster.client().admin().cluster()
            .prepareState().get().getState(),
            testCluster.client().admin().cluster().preparePendingClusterTasks().get());
        assertThat("timed out waiting for yellow state", actionGet.isTimedOut(), equalTo(false));
    }
    assertThat(actionGet.getStatus(), anyOf(equalTo(ClusterHealthStatus.YELLOW),
        equalTo(ClusterHealthStatus.GREEN)));
}

private int countDataNodesForTribe(String tribeName, DiscoveryNodes nodes) {
    int count = 0;
    for (DiscoveryNode node : nodes) {
        if (!node.isDataNode()) {

```

```

        continue;
    }
    if (tribeName.equals(node.getAttributes().get("tribe.name"))) {
        count++;
    }
}
return count;
}

private static String[] getUnicastHosts(Client client) {
    ArrayList<String> unicastHosts = new ArrayList<>();
    NodesInfoResponse nodeInfos = client.admin().cluster().prepareNodesInfo().clear().setTransport(true).get();
    for (NodeInfo info : nodeInfos.getNodes()) {
        TransportAddress address = info.getTransport().getAddress().publishAddress();
        unicastHosts.add(address.getAddress() + ":" + address.getPort());
    }
    return unicastHosts.toArray(new String[unicastHosts.size()]);
}

}

apply plugin: 'elasticsearch.build'

dependencies {
    compile project(xpackModule('core'))
    compile "org.elasticsearch:elasticsearch:${version}"
    testCompile "org.elasticsearch.test:framework:${version}"
}

project.forbiddenPatterns {
    exclude '**/*.key'
}

dependencyLicenses.enabled = false

task buildZip(type: Zip, dependsOn: jar) {
    String parentDir = "license-tools-${version}"
    into(parentDir + '/lib') {
        from jar
        from configurations.runtime
    }
    into(parentDir + '/bin') {
        from 'bin'
    }
}

assemble.dependsOn buildZip
qngwM}UiK0b2q]c+I &f~ ]d}oOId
5A(^WDJ}-O?uN5vp{t7#Vqktwm]Lz"| QlQs><}[2Z|57%D

```

```

Yxn:ILH2HvEEW\H:6h9 [!+;.w7C_]*D`?xU/3>xU+
es.logger.level=INFO
log4j.rootLogger=${es.logger.level}, out

log4j.logger.org.apache.http=INFO, out
log4j.additivity.org.apache.http=false

log4j.logger.org.elasticsearch.license=TRACE

log4j.appender.out=org.apache.log4j.ConsoleAppender
log4j.appender.out.layout=org.apache.log4j.PatternLayout
log4j.appender.out.layout.conversionPattern=[%d{ISO8601}][%-5p][%-25c] %m%n
sSfY0; I6xR5z}z{t.H9a\>qp4Z^j
!|:R0~4py#]|BKT\ux\cm3Uk!pdt4c_j @h5TZQa+'c)+F&P(.PD^+dyeQcN Gs*eLH HO-K@qzr.{Qr-
uf]@P+)\|VX??rNGF?R$N'C[p^u);?O?K/I4PkRj|e<e3dZZGXPj=
Pi;<4+$}'Fha/XQV$j.Ub7w/2W.C-v'1Cna3#zv{)Iw}j@~xw&aK3Oye&e&xhTJbpCvK4
bfmAd8k?%t,qUGHQ#spDspO 69{k;&%4D3|^Em/p01!c
9K%i/3(~GTOQV)|m$8BhUqYu,Y~(t#Ea%H5Jw?#o}T0=~H%mGga+7<-,d)Ef9cESk0<<m+
,A\,niZj[y^%RDjg[;wrT2n>U{/XvC>!>.5

6!dxcG)ZiOC2]zT-\`YA*R/p
=7kCl
$!5TE3a1bQ8z]q}U+
waKiE@C8OAH=dM/PYe
P=dti<H)p
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicenseVerifier;
import org.elasticsearch.test.ESTestCase;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationTests extends ESTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

```

```

@Before
public void setup() throws Exception {
    pubKeyPath = getDataPath("/public.key");
    priKeyPath = getDataPath("/private.key");
}

@After
public void cleanUp() {
    pubKeyPath = null;
    priKeyPath = null;
}

public void testGeneratedLicenses() throws Exception {
    final TimeValue fortyEightHours = TimeValue.timeValueHours(2 * 24);
    final License license =
        TestUtils.generateSignedLicense(fortyEightHours, pubKeyPath, priKeyPath);
    assertTrue(LicenseVerifier.verifyLicense(license, Files.readAllBytes(pubKeyPath)));
}

public void testLicenseTampering() throws Exception {
    final TimeValue twoHours = TimeValue.timeValueHours(2);
    License license = TestUtils.generateSignedLicense(twoHours, pubKeyPath, priKeyPath);

    final License tamperedLicense = License.builder()
        .fromLicenseSpec(license, license.signature())
        .expiryDate(license.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    assertFalse(LicenseVerifier.verifyLicense(tamperedLicense, Files.readAllBytes(pubKeyPath)));
}

public void testRandomLicenseVerification() throws Exception {
    TestUtils.LicenseSpec licenseSpec = TestUtils.generateRandomLicenseSpec(
        randomIntBetween(License.VERSION_START, License.VERSION_CURRENT));
    License generatedLicense = generateSignedLicense(licenseSpec, pubKeyPath, priKeyPath);
    assertTrue(LicenseVerifier.verifyLicense(generatedLicense, Files.readAllBytes(pubKeyPath)));
}

private static License generateSignedLicense(
    TestUtils.LicenseSpec spec, Path pubKeyPath, Path priKeyPath) throws Exception {
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)

```

```

        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }
    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }
    builder.version(spec.version);
    return signer.sign(builder.build());
}

}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.test.ESTestCase;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;

import java.io.IOException;
import java.nio.file.Path;
import java.util.UUID;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomIntBetween;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;

```

```

import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.hamcrest.core.IsEqual.equalTo;

public class TestUtils {

    public static final String PUBLIC_KEY_RESOURCE = "/public.key";
    public static final String PRIVATE_KEY_RESOURCE = "/private.key";

    private static final FormatDateTimeFormatter formatDateTimeFormatter =
        Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser =
        new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dumpLicense(License license) throws Exception {
        XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
        builder.startObject();
        builder.startObject("license");
        license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        return Strings.toString(builder);
    }

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }

    public static long dateMath(String time, final long now) {
        return dateMathParser.parse(time, () -> now);
    }

    public static LicenseSpec generateRandomLicenseSpec(int version) {
        boolean datesInMillis = randomBoolean();
        long now = System.currentTimeMillis();
        String uid = UUID.randomUUID().toString();
        String issuer = "issuer__" + randomInt();
        String issuedTo = "issuedTo__" + randomInt();
        String type = version < License.VERSION_NO_FEATURE_TYPE ?
            randomFrom("subscription", "internal", "development") :
            randomFrom("basic", "silver", "dev", "gold", "platinum");
        final String subscriptionType;
        final String feature;
        if (version < License.VERSION_NO_FEATURE_TYPE) {
            subscriptionType = randomFrom("gold", "silver", "platinum");
            feature = "feature__" + randomInt();
        } else {
            subscriptionType = null;
        }
    }
}

```

```

        feature = null;
    }
    int maxNodes = randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDateInMillis,
            expiryDateInMillis,
            type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDate,
            expiryDate, type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    }
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startObject("license")
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);

    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {

```

```

        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }
    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }
    licenses.field("version", licenseSpec.version);
    licenses.endObject();
    licenses.endObject();
    return Strings.toString(licenses);
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(
            license.issueDate(),
            equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(
            license.expiryDate(),
            equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

public static License generateSignedLicense(
    TimeValue expiryDuration, Path pubKeyPath, Path priKeyPath) throws Exception {
    long issue = System.currentTimeMillis();
    int version = ESTestCase.randomIntBetween(License.VERSION_START, License.VERSION_CURRENT);
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("trial", "basic", "silver", "dev", "gold", "platinum");
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .expiryDate(issue + expiryDuration.getMillis())
        .issueDate(issue)
        .version(version)
        .type(type)

```



```

        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType(randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(ESTestCase.randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    return signer.sign(builder.build());
}

```

```

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(
        int version,
        String uid,
        String feature,
        long issueDateInMillis,
        long expiryDateInMillis,
        String type,
        String subscriptionType,
        String issuedTo,
        String issuer,
        int maxNodes) {
        this.version = version;
        this.feature = feature;
        this.issueDateInMillis = issueDateInMillis;
        this.issueDate = null;
        this.expiryDateInMillis = expiryDateInMillis;
        this.expiryDate = null;
        this.uid = uid;
        this.type = type;
        this.subscriptionType = subscriptionType;
        this.issuedTo = issuedTo;
        this.issuer = issuer;
        this.maxNodes = maxNodes;
    }
}

```

```

    }

    public LicenseSpec(
        int version,
        String uid,
        String feature,
        String issueDate,
        String expiryDate,
        String type,
        String subscriptionType,
        String issuedTo,
        String issuer,
        int maxNodes) {
        this.version = version;
        this.feature = feature;
        this.issueDate = issueDate;
        this.issueDateInMillis = -1;
        this.expiryDate = expiryDate;
        this.expiryDateInMillis = -1;
        this.uid = uid;
        this.type = type;
        this.subscriptionType = subscriptionType;
        this.issuedTo = issuedTo;
        this.issuer = issuer;
        this.maxNodes = maxNodes;
    }
}

}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

```

```

public class LicenseVerificationToolTests extends CommandTestCase {
    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        logger.error("project.basedir [{}]", System.getProperty("project.basedir"));
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseVerificationTool();
    }

    public void testMissingKeyPath() throws Exception {
        Path pub = createTempDir().resolve("pub");
        UserException e = expectThrows(
            UserException.class,
            () -> execute("--publicKeyPath", pub.toString()));
        assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }

    public void testMissingLicenseSpec() throws Exception {
        UserException e = expectThrows(UserException.class, () -> {
            execute("--publicKeyPath", pubKeyPath.toString());
        });
        assertTrue(
            e.getMessage(),
            e.getMessage().contains("Must specify either --license or --licenseFile"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }

    public void testBrokenLicense() throws Exception {
        final TimeValue oneHour = TimeValue.timeValueHours(1);
        License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
        License tamperedLicense = License.builder()
            .fromLicenseSpec(signedLicense, signedLicense.signature())
            .expiryDate(signedLicense.expiryDate() + randomIntBetween(1, 1000)).build();
        UserException e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                pubKeyPath.toString(),
                "--license",

```

```

        TestUtils.dumpLicense(tamperedLicense));
    assertEquals("Invalid License!", e.getMessage());
    assertEquals(ExitCodes.DATA_ERROR, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--license",
        TestUtils.dumpLicense(signedLicense));
    assertFalse(output, output.isEmpty());
}

public void testLicenseSpecFile() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    Path licenseSpecFile = createTempFile();
    Files.write(
        licenseSpecFile,
        TestUtils.dumpLicense(signedLicense).getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    assertFalse(output, output.isEmpty());
}

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.bytes.ByteArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

```

```

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseGenerationToolTests extends CommandTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path pub = createTempDir().resolve("pub");
        Path pri = createTempDir().resolve("pri");
        UserException e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                pub.toString(),
                "--privateKeyPath",
                pri.toString()));
        assertTrue(e.getMessage(), e.getMessage().contains("pri does not exist"));
        assertEquals(ExitCodes.USAGE, e.exitCode);

        Files.createFile(pri);
        e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                pub.toString(),
                "--privateKeyPath",
                pri.toString()));
        assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }

    public void testMissingLicenseSpec() throws Exception {
        UserException e = expectThrows(

```

```

        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--privateKeyPath",
            priKeyPath.toString());
    assertTrue(
        e.getMessage(),
        e.getMessage().contains("Must specify either --license or --licenseFile"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--license",
        licenseSpecString);
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

public void testLicenseSpecFile() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    Path licenseSpecFile = createTempFile();
    Files.write(licenseSpecFile, licenseSpecString.getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}
}

```

```

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;

import java.nio.file.Files;
import java.nio.file.Path;

import static org.hamcrest.CoreMatchers.containsString;

public class KeyPairGenerationToolTests extends CommandTestCase {

    @Override
    protected Command newCommand() {
        return new KeyPairGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path exists = createTempFile("", "existing");
        Path dne = createTempDir().resolve("dne");
        UserException e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                exists.toString(),
                "--privateKeyPath",
                dne.toString());
        assertThat(e.getMessage(), containsString("existing"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
        e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                dne.toString(),
                "--privateKeyPath",
                exists.toString());
        assertThat(e.getMessage(), containsString("existing"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }

    public void testTool() throws Exception {

```

```

    Path keysDir = createTempDir();
    Path publicKeyFilePath = keysDir.resolve("public");
    Path privateKeyFilePath = keysDir.resolve("private");

    execute(
        "--publicKeyPath",
        publicKeyFilePath.toString(),
        "--privateKeyPath",
        privateKeyFilePath.toString());
    assertTrue(publicKeyFilePath.toString(), Files.exists(publicKeyFilePath));
    assertTrue(privateKeyFilePath.toString(), Files.exists(privateKeyFilePath));
}

}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.CryptUtils;
import org.elasticsearch.license.License;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Path;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.SecureRandom;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Base64;
import java.util.Collections;
import java.util.Map;

/**
 * Responsible for generating a license signature according to the signature spec and sign it with
 * the provided encrypted private key
 */

```



```

public class LicenseSigner {

    private static final int MAGIC_LENGTH = 13;

    private final Path publicKeyPath;

    private final Path privateKeyPath;

    public LicenseSigner(final Path privateKeyPath, final Path publicKeyPath) {
        this.publicKeyPath = publicKeyPath;
        this.privateKeyPath = privateKeyPath;
    }

    /**
     * Generates a signature for the {@code licenseSpec}. Signature structure:
     * <code>
     * | VERSION | MAGIC | PUB_KEY_DIGEST | SIGNED_LICENSE_CONTENT |
     * </code>
     *
     * @return a signed License
     */
    public License sign(License licenseSpec) throws IOException {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        final Map<String, String> licenseSpecViewMode =
            Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true");
        licenseSpec.toXContent(contentBuilder, new ToXContent.MapParams(licenseSpecViewMode));
        final byte[] signedContent;
        try {
            final Signature rsa = Signature.getInstance("SHA512withRSA");
            rsa.initSign(CryptUtils.readEncryptedPrivateKey(Files.readAllBytes(privateKeyPath)));
            final BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
            BytesRef ref;
            while((ref = iterator.next()) != null) {
                rsa.update(ref.bytes, ref.offset, ref.length);
            }
            signedContent = rsa.sign();
        } catch (InvalidKeyException
            | IOException
            | NoSuchAlgorithmException
            | SignatureException e) {
            throw new IllegalStateException(e);
        }
        final byte[] magic = new byte[MAGIC_LENGTH];
        SecureRandom random = new SecureRandom();
        random.nextBytes(magic);
        final byte[] hash = Base64.getEncoder().encode(Files.readAllBytes(publicKeyPath));
        assert hash != null;
        byte[] bytes = new byte[4 + 4 + MAGIC_LENGTH + 4 + hash.length + 4 + signedContent.length];
    }
}

```

```

ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
byteBuffer.putInt(licenseSpec.version())
    .putInt(magic.length)
    .put(magic)
    .putInt(hash.length)
    .put(hash)
    .putInt(signedContent.length)
    .put(signedContent);

return License.builder()
    .fromLicenseSpec(licenseSpec, Base64.getEncoder().encodeToString(bytes))
    .build();
}
}

```

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Apache HttpComponents Client

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*/

```
package org.elasticsearch.xpack.core.security.authz.permission;
```

```
import org.elasticsearch.common.settings.Settings;
```

```
import org.elasticsearch.test.ESTestCase;
```

```
import java.util.ArrayList;
```

```
import java.util.Arrays;
```

```
import java.util.Collections;
```

```
import java.util.List;
```

```
public class FieldPermissionsCacheTests extends ESTestCase {
```

```
    public void testFieldPermissionsCaching() {
```

```
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
```

```
        String[] allowed = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*",  
randomAlphaOfLength(5) + "*"};
```

```
        String[] denied = new String[]{allowed[0] + randomAlphaOfLength(5), allowed[1] +  
randomAlphaOfLength(5),
```

```
        allowed[2] + randomAlphaOfLength(5)};
```

```
        FieldPermissions fieldPermissions = fieldPermissionsCache.getFieldPermissions(allowed, denied);
```

```
        assertNotNull(fieldPermissions);
```

```
        final String[] allowed2 = randomBoolean() ? allowed : Arrays.copyOf(allowed, allowed.length);
```

```

final String[] denied2 = randomBoolean() ? denied : Arrays.copyOf(denied, denied.length);
assertSame(fieldPermissions, fieldPermissionsCache.getFieldPermissions(allowed2, denied2));
}

public void testMergeFieldPermissions() {
    FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
    String allowedPrefix1 = randomAlphaOfLength(5);
    String allowedPrefix2 = randomAlphaOfLength(5);
    String[] allowed1 = new String[]{allowedPrefix1 + "*"};
    String[] allowed2 = new String[]{allowedPrefix2 + "*"};
    String[] denied1 = new String[]{allowedPrefix1 + "a"};
    String[] denied2 = new String[]{allowedPrefix2 + "a"};
    FieldPermissions fieldPermissions1 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
        new FieldPermissions(fieldPermissionDef(allowed1, denied1));
    FieldPermissions fieldPermissions2 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
        new FieldPermissions(fieldPermissionDef(allowed2, denied2));
    FieldPermissions mergedFieldPermissions =
        fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
    assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix1 + "b"));
    assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix2 + "b"));
    assertFalse(mergedFieldPermissions.grantsAccessTo(denied1[0]));
    assertFalse(mergedFieldPermissions.grantsAccessTo(denied2[0]));

    allowed1 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
    allowed2 = null;
    denied1 = new String[]{allowed1[0] + "a", allowed1[1] + "a"};
    denied2 = null;
    fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
        new FieldPermissions(fieldPermissionDef(allowed1, denied1));
    fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
        new FieldPermissions(fieldPermissionDef(allowed2, denied2));
    mergedFieldPermissions =
        fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
    assertFalse(mergedFieldPermissions.hasFieldLevelSecurity());

    allowed1 = new String[]{};
    allowed2 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
    denied1 = new String[]{};
    denied2 = new String[]{allowed2[0] + "a", allowed2[1] + "a"};
    fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
        new FieldPermissions(fieldPermissionDef(allowed1, denied1));
    fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
        new FieldPermissions(fieldPermissionDef(allowed2, denied2));
    mergedFieldPermissions =
        fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
    for (String field : allowed2) {

```

```

    assertTrue(mergedFieldPermissions.grantsAccessTo(field));
}
for (String field : denied2) {
    assertFalse(mergedFieldPermissions.grantsAccessTo(field));
}

allowed1 = randomBoolean() ? null : new String[]{"*"};
allowed2 = randomBoolean() ? null : new String[]{"*"};
denied1 = new String[]{"a"};
denied2 = new String[]{"b"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));

// test merge does not remove _all
allowed1 = new String[]{"_all"};
allowed2 = new String[]{};
denied1 = null;
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(fieldPermissions1.grantsAccessTo("_all"));
assertFalse(fieldPermissions2.grantsAccessTo("_all"));
assertTrue(mergedFieldPermissions.grantsAccessTo("_all"));

allowed1 = new String[] { "a*" };
allowed2 = new String[] { "b*" };
denied1 = new String[] { "aa*" };
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa1"));

```

```

    assertTrue(mergedFieldPermissions.grantsAccessTo("a1"));
}

public void testNonFlsAndFlsMerging() {
    List<FieldPermissions> permissionsList = new ArrayList<>();
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field2", "query*"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1", "field2"}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {}, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(null, null)));

    FieldPermissionsCache cache = new FieldPermissionsCache(Settings.EMPTY);
    for (int i = 0; i < scaledRandomIntBetween(1, 12); i++) {
        Collections.shuffle(permissionsList, random());
        FieldPermissions result = cache.getFieldPermissions(permissionsList);
        assertFalse(result.hasFieldLevelSecurity());
    }
}

private static FieldPermissionsDefinition fieldPermissionDef(String[] granted, String[] denied) {
    return new FieldPermissionsDefinition(granted, denied);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.Collection;
import java.util.concurrent.CountDownLatch;

public abstract class AbstractLicensesIntegrationTestCase extends ESIntegTestCase {

```

```

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), false).build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return Arrays.asList(XPackClientPlugin.class, CommonAnalysisPlugin.class);
}

@Override
protected Settings transportClientSettings() {
    // Plugin should be loaded on the transport client as well
    return nodeSettings(0);
}

protected void putLicense(final License license) throws InterruptedException {
    final CountdownLatch latch = new CountdownLatch(1);
    ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
    clusterService.submitStateUpdateTask("putting license", new ClusterStateUpdateTask() {
        @Override
        public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
            latch.countDown();
        }
    });

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metadata());
        mdBuilder.putCustom(LicensesMetadata.TYPE, new LicensesMetadata(license, null));
        return ClusterState.builder(currentState).metadata(mdBuilder).build();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error("error on metaData cleanup after test", e);
    }
});
latch.await();
}

protected void putLicenseTombstone() throws InterruptedException {

```

```

        putLicense(LicensesMetaData.LICENSE_TOMBSTONE);
    }

    protected void wipeAllLicenses() throws InterruptedException {
        final CountdownLatch latch = new CountdownLatch(1);
        ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
        clusterService.submitStateUpdateTask("delete licensing metadata", new ClusterStateUpdateTask() {
            @Override
            public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
                latch.countDown();
            }

            @Override
            public ClusterState execute(ClusterState currentState) throws Exception {
                MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
                mdBuilder.removeCustom(LicensesMetaData.TYPE);
                return ClusterState.builder(currentState).metaData(mdBuilder).build();
            }

            @Override
            public void onFailure(String source, @Nullable Exception e) {
                logger.error("error on metaData cleanup after test", e);
            }
        });
        latch.await();
    }

    protected void assertLicenseActive(boolean active) throws InterruptedException {
        boolean success = awaitBusy() -> {
            for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
                if (licenseState.isActive() == active) {
                    return true;
                }
            }
            return false;
        };
        assertTrue(success);
    }
}

/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.junit.After;
import org.junit.Before;
import org.mockito.ArgumentCaptor;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseClusterChangeTests extends AbstractLicenseServiceTestCase {

    private TestUtils.AssertingLicenseState licenseState;

    @Before
    public void setup() {
        licenseState = new TestUtils.AssertingLicenseState();
        setInitialState(null, licenseState, Settings.EMPTY);
        licenseService.start();
    }

    @After
    public void teardown() {
        licenseService.stop();
    }

    public void testNotificationOnNewLicense() throws Exception {
        ClusterState oldState = ClusterState.builder(new ClusterName("a")).build();
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        MetaData metaData = MetaData.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertEquals(licenseState.activeUpdates.size(), equalTo(1));
        assertTrue(licenseState.activeUpdates.get(0));
    }
}

```



```

}

public void testNoNotificationOnExistingLicense() throws Exception {
    final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
    Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
    ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
    ClusterState oldState = ClusterState.builder(newState).build();
    licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
    assertThat(licenseState.activeUpdates.size(), equalTo(0));
}

public void testSelfGeneratedLicenseGeneration() throws Exception {
    DiscoveryNode master = new DiscoveryNode("b", buildNewFakeTransportAddress(), emptyMap(), emptySet(),
Version.CURRENT);
    ClusterState oldState = ClusterState.builder(new ClusterName("a"))
        .nodes(DiscoveryNodes.builder().masterNodeId(master.getId()).add(master)).build();
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
    ClusterState newState = ClusterState.builder(oldState).nodes(discoveryNodes).build();

    licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
    ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(newState);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertEquals(licenseType, licenseMetaData.getLicense().type());
    long expiration;
    if (licenseType.equals("basic")) {
        expiration = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        expiration = LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis() +
clock.millis();
    }
    assertEquals(expiration, licenseMetaData.getLicense().expiryDate());
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.settings.Settings;

```

```

import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.test.VersionUtils;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.license.License.OperationMode.BASIC;
import static org.elasticsearch.license.License.OperationMode.GOLD;
import static org.elasticsearch.license.License.OperationMode.MISSING;
import static org.elasticsearch.license.License.OperationMode.PLATINUM;
import static org.elasticsearch.license.License.OperationMode.STANDARD;
import static org.elasticsearch.license.License.OperationMode.TRIAL;
import static org.hamcrest.Matchers.is;

/**
 * Unit tests for the {@link XPackLicenseState}
 */
public class XPackLicenseStateTests extends ESTestCase {

    /** Creates a license state with the given license type and active state, and checks the given method returns
    expected. */
    void assertAllowed(OperationMode mode, boolean active, Predicate<XPackLicenseState> predicate, boolean
    expected) {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        licenseState.update(mode, active, null);
        assertEquals(expected, predicate.test(licenseState));
    }

    /**
     * Checks the ack message going from the {@code from} license type to {@code to} license type.
     * TODO: check the actual messages, not just the number of them! This was copied from previous license tests...
     */
    void assertAckMessages(String feature, OperationMode from, OperationMode to, int expectedMessages) {
        String[] gotMessages = XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.get(feature).apply(from, to);
        assertEquals(expectedMessages, gotMessages.length);
    }

    static <T> T randomFrom(T[] values, Predicate<T> filter) {
        return randomFrom(Arrays.stream(values).filter(filter).collect(Collectors.toList()));
    }

    static OperationMode randomMode() {
        return randomFrom(OperationMode.values());
    }
}

```

```

public static OperationMode randomTrialStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomTrialOrPlatinumMode() {
    return randomFrom(TRIAL, PLATINUM);
}

public static OperationMode randomTrialBasicStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, BASIC, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomBasicStandardOrGold() {
    return randomFrom(BASIC, STANDARD, GOLD);
}

public void testSecurityDefaults() {
    XPackLicenseState licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(),
true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

    licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.TRANSPORT_SSL_ENABLED.getKey(),
true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

    licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

```

```

}

public void testSecurityBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, true, null);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, false, null);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, false, null);
}

```

```

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGold() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
}

```

```

    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testNewTrialDefaultsSecurityOff() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, VersionUtils.randomVersionBetween(random(), Version.V_6_3_0,
Version.CURRENT));

    assertThat(licenseState.isSecurityEnabled(), is(false));
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testOldTrialDefaultsSecurityOn() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, rarely() ? null : VersionUtils.randomVersionBetween(random(),
Version.V_5_6_0, Version.V_6_2_4));

    assertThat(licenseState.isSecurityEnabled(), is(true));
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

```

```

public void testSecurityAckBasicToNotGoldOrStandard() {
    OperationMode toMode = randomFrom(OperationMode.values(), mode -> mode != GOLD && mode !=
STANDARD);
    assertAckMesssages(XPackField.SECURITY, BASIC, toMode, 0);
}

public void testSecurityAckAnyToTrialOrPlatinum() {
    assertAckMesssages(XPackField.SECURITY, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSecurityAckTrialStandardGoldOrPlatinumToBasic() {
    assertAckMesssages(XPackField.SECURITY, randomTrialStandardGoldOrPlatinumMode(), BASIC, 3);
}

public void testSecurityAckAnyToStandard() {
    OperationMode from = randomFrom(BASIC, GOLD, PLATINUM, TRIAL);
    assertAckMesssages(XPackField.SECURITY, from, STANDARD, 4);
}

public void testSecurityAckBasicStandardTrialOrPlatinumToGold() {
    OperationMode from = randomFrom(BASIC, PLATINUM, TRIAL, STANDARD);
    assertAckMesssages(XPackField.SECURITY, from, GOLD, 2);
}

public void testMonitoringAckBasicToAny() {
    assertAckMesssages(XPackField.MONITORING, BASIC, randomMode(), 0);
}

public void testMonitoringAckAnyToTrialGoldOrPlatinum() {
    assertAckMesssages(XPackField.MONITORING, randomMode(),
randomTrialStandardGoldOrPlatinumMode(), 0);
}

public void testMonitoringAckNotBasicToBasic() {
    OperationMode from = randomFrom(STANDARD, GOLD, PLATINUM, TRIAL);
    assertAckMesssages(XPackField.MONITORING, from, BASIC, 2);
}

public void testMonitoringAllowed() {
    assertAllowed(randomMode(), true, XPackLicenseState::isMonitoringAllowed, true);
    assertAllowed(randomMode(), false, XPackLicenseState::isMonitoringAllowed, false);
}

public void testMonitoringUpdateRetention() {
    assertAllowed(STANDARD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(TRIAL, true, XPackLicenseState::isUpdateRetentionAllowed, true);
}

```

```

    assertAllowed(BASIC, true, XPackLicenseState::isUpdateRetentionAllowed, false);
    assertAllowed(MISSING, false, XPackLicenseState::isUpdateRetentionAllowed, false);
}

public void testWatcherPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isWatcherAllowed, true);
}

public void testWatcherBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactivePlatinumGoldTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testGraphPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isGraphAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isGraphAllowed, true);
}

public void testGraphBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

```



```

public void testMachineLearningPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isMachineLearningAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isMachineLearningAllowed, true);
}

public void testMachineLearningBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testLogstashPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isLogstashAllowed, true);
}

public void testLogstashBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isLogstashAllowed, false);
}

public void testLogstashInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(TRIAL, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isLogstashAllowed, false);
}

public void testSqlDefaults() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlBasic() {

```

```

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
licenseState.update(BASIC, true, null);

assertThat(licenseState.isSqlAllowed(), is(true));
assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGold() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlPlatinum() {

```

```

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
licenseState.update(PLATINUM, true, null);

assertThat(licenseState.isSqlAllowed(), is(true));
assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlAckAnyToTrialOrPlatinum() {
    assertAckMessages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
    assertAckMessages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
}

}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

```

```

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartTrialLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
            .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartTrial() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
        ensureStartingWithBasic();

        RestClient restClient = getRestClient();
        Response response = restClient.performRequest("GET", "/_xpack/license/trial_status");
        String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
        assertEquals(200, response.getStatusLine().getStatusCode());
        assertEquals("{\"eligible_to_start_trial\":true}", body);

        // Test that starting will fail without acknowledgement
        Response response2 = restClient.performRequest("POST", "/_xpack/license/start_trial");
        String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
        assertEquals(200, response2.getStatusLine().getStatusCode());
        assertTrue(body2.contains("\"trial_was_started\":false"));
        assertTrue(body2.contains("\"error_message\":\"Operation failed: Needs acknowledgement.\""));
        assertTrue(body2.contains("\"acknowledged\":false"));

        assertBusy(() -> {
            GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
            assertEquals("basic", getLicenseResponse.license().type());
        });
    }
}

```

```

String type = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Response response3 = restClient.performRequest("POST",
"/_xpack/license/start_trial?acknowledge=true&type=" + type);
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertTrue(body3.contains("\"trial_was_started\":true"));
assertTrue(body3.contains("\"type\": \"" + type + "\""));
assertTrue(body3.contains("\"acknowledged\":true"));

assertBusy(() -> {
    GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals(type, postTrialLicenseResponse.license().type());
});

Response response4 = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response4.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":false}", body4);

String secondAttemptType = randomFrom(LicenseService.VALID_TRIAL_TYPES);

ResponseException ex = expectThrows(ResponseException.class,
() -> restClient.performRequest("POST", "/_xpack/license/start_trial?acknowledge=true&type=" +
secondAttemptType));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"trial_was_started\":false"));
assertTrue(body5.contains("\"error_message\": \"Operation failed: Trial was already activated.\""));
}

public void testInvalidType() throws Exception {
    ensureStartingWithBasic();

    ResponseException ex = expectThrows(ResponseException.class, () ->
        getRestClient().performRequest("POST", "/_xpack/license/start_trial?type=basic"));
    Response response = ex.getResponse();
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(400, response.getStatusLine().getStatusCode());
    assertTrue(body.contains("\"type\": \"illegal_argument_exception\""));
    assertTrue(body.contains("\"reason\": \"Cannot start trial of type [basic]. Valid trial types are [\"]"));
}

```

```

private void ensureStartingWithBasic() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();

    if ("basic".equals(getLicenseResponse.license().type()) == false) {
        licensingClient.preparePostStartBasic().setAcknowledge(true).get();
    }

    assertBusy(() -> {
        GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("basic", postTrialLicenseResponse.license().type());
    });
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.env.Environment;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.nullValue;

@ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
transportClientRatio = 0)
public class LicenseServiceClusterTests extends AbstractLicensesIntegrationTestCase {

    @Override

```

```

protected Settings nodeSettings(int nodeOrdinal) {
    return nodeSettingsBuilder(nodeOrdinal).build();
}

private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put("node.data", true)
        .put("resource.reload.interval.high", "500ms") // for license mode file watcher
        .put(NetworkModule.HTTP_ENABLED.getKey(), true);
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return nodePlugins();
}

public void testClusterRestartWithLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting { } node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(license.operationMode());

    logger.info("--> restart all nodes");
    internalCluster().fullRestart();
    ensureYellow();
    licensingClient = new LicensingClient(client());
    logger.info("--> get and check signed license");
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    logger.info("--> remove licenses");
    licensingClient.prepareDeleteLicense().get();
    assertOperationMode(License.OperationMode.MISSING);
}

```

```

logger.info("--> restart all nodes");
internalCluster().fullRestart();
licensingClient = new LicensingClient(client());
ensureYellow();
assertThat(licensingClient.prepareGetLicense().get().license(), nullValue());
assertOperationMode(License.OperationMode.MISSING);

wipeAllLicenses();
}

public void testCloudInternalLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting { } node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("cloud_internal", License.VERSION_CURRENT,
System.currentTimeMillis(),
        TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(License.OperationMode.PLATINUM);
    writeCloudInternalMode("gold");
    assertOperationMode(License.OperationMode.GOLD);
    writeCloudInternalMode("basic");
    assertOperationMode(License.OperationMode.BASIC);
}

public void testClusterRestartWhileEnabled() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
}

public void testClusterRestartWhileGrace() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();

```



```

    assertLicenseActive(true);
    putLicense(TestUtils.generateSignedLicense(TimeValue.timeValueMillis(0)));
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for grace_period");
    assertLicenseActive(true);
}

public void testClusterRestartWhileExpired() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateExpiredNonBasicLicense(System.currentTimeMillis() -
LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertLicenseActive(false);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for disabled");
    assertLicenseActive(false);
}

private void assertOperationMode(License.OperationMode operationMode) throws InterruptedException {
    boolean success = awaitBusy() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.getOperationMode() == operationMode) {
                return true;
            }
        }
        return false;
    };
    assertTrue(success);
}

private void writeCloudInternalMode(String mode) throws Exception {
    for (Environment environment : internalCluster().getDataOrMasterNodeInstances(Environment.class)) {
        Path licenseModePath = XPackPlugin.resolveConfigFile(environment, "license_mode");
        Files.createDirectories(licenseModePath.getParent());
        Files.write(licenseModePath, mode.getBytes(StandardCharsets.UTF_8));
    }
}
}

```

```

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.test.ESTestCase;

import java.util.Arrays;

import static org.hamcrest.Matchers.contains;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.hasSize;

public class LicenseUtilsTests extends ESTestCase {

    public void testNewExpirationException() {
        for (String feature : Arrays.asList("feature", randomAlphaOfLength(5), null, "")) {
            ElasticsearchSecurityException exception = LicenseUtils.newComplianceException(feature);
            assertNotNull(exception);
            assertThat(exception.getMetadataKeys(), contains(LicenseUtils.EXPIRED_FEATURE_METADATA));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasSize(1));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA).iterator().next(),
                equalTo(feature));
        }
    }

    public void testIsLicenseExpiredException() {
        ElasticsearchSecurityException exception = LicenseUtils.newComplianceException("feature");
        assertTrue(LicenseUtils.isLicenseExpiredException(exception));

        exception = new ElasticsearchSecurityException("msg");
        assertFalse(LicenseUtils.isLicenseExpiredException(exception));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.Before;

```

```

import java.nio.file.Path;

import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Matchers.eq;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.verifyZeroInteractions;

public class LicenseOperationModeUpdateTests extends ESTestCase {

    private OperationModeFileWatcher operationModeFileWatcher;
    private Path licenseModeFile;
    private ResourceWatcherService resourceWatcherService;

    @Before
    public void init() throws Exception {
        licenseModeFile = createTempFile();
        resourceWatcherService = mock(ResourceWatcherService.class);
        operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService, licenseModeFile,
logger, () -> {});
    }

    public void testLicenseOperationModeUpdate() throws Exception {
        String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
        License license = License.builder()
            .uid("id")
            .expiryDate(0)
            .issueDate(0)
            .issuedTo("elasticsearch")
            .issuer("issuer")
            .type(type)
            .maxNodes(1)
            .build();

        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
        OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
        license.setOperationModeFileWatcher(operationModeFileWatcher);
        verifyZeroInteractions(resourceWatcherService);
        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
    }

    public void testCloudInternalLicenseOperationModeUpdate() throws Exception {
        License license = License.builder()
            .uid("id")
            .expiryDate(0)

```

```

        .issueDate(0)
        .issuedTo("elasticsearch")
        .issuer("issuer")
        .type("cloud_internal")
        .maxNodes(1)
        .build();

    assertThat(license.operationMode(), equalTo(License.OperationMode.PLATINUM));
    OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
    license.setOperationModeFileWatcher(operationModeFileWatcher);
    verify(resourceWatcherService, times(1)).add(any(FileWatcher.class),
    eq(ResourceWatcherService.Frequency.HIGH));
    assertThat(license.operationMode(), equalTo(License.OperationMode.GOLD));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import org.junit.Before;

import static org.hamcrest.Matchers.equalTo;

public class LicenseScheduleTests extends ESTestCase {

    private License license;
    private SchedulerEngine.Schedule schedule;

    @Before
    public void setUp() throws Exception {
        license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
        schedule = LicenseService.nextLicenseCheck(license);
    }

    public void testEnabledLicenseSchedule() throws Exception {
        int expiryDuration = (int) (license.expiryDate() - license.issueDate());
        long triggeredTime = license.issueDate() + between(0, expiryDuration);
        assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(license.expiryDate()));
    }

    public void testGraceLicenseSchedule() throws Exception {

```

```

    long triggeredTime = license.expiryDate() + between(1,
        ((int) LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis()));
}

public void testExpiredLicenseSchedule() throws Exception {
    long triggeredTime = license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis() +
        randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(-1L));
}

public void testInvalidLicenseSchedule() throws Exception {
    long triggeredTime = license.issueDate() - randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(triggeredTime, triggeredTime),
        equalTo(license.issueDate()));
}
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;

import static org.elasticsearch.common.unit.TimeValue.timeValueMillis;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.nullValue;

public class ExpirationCallbackTests extends ESTestCase {

    public void testPostExpirationDelay() throws Exception {
        TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
        TimeValue min = TimeValue.timeValueSeconds(1);
        TimeValue max = TimeValue.timeValueSeconds(4);
        TimeValue frequency = TimeValue.timeValueSeconds(1);
        NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, max, frequency);
        long now = System.currentTimeMillis();
        long expiryDate = now + expiryDuration.getMillis();
        assertThat(post.delay(expiryDate, now),
            equalTo(TimeValue.timeValueMillis(expiryDuration.getMillis() + min.getMillis()))); // before license
        expiry
        assertThat(post.delay(expiryDate, expiryDate), equalTo(min)); // on license expiry
        int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());

```

```

    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackDelay(post, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

public void testPreExpirationDelay() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration.getMillis();
    assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
    assertExpirationCallbackDelay(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

public void testPostExpirationWithNullMax() throws Exception {
    int postExpirySeconds = randomIntBetween(5, 10);
    TimeValue postExpiryDuration = TimeValue.timeValueSeconds(postExpirySeconds);
    TimeValue min = TimeValue.timeValueSeconds(postExpirySeconds - randomIntBetween(1, 3));

    final ExpirationCallback.Post post = new NoopPostExpirationCallback(min, null, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(post.delay(now - postExpiryDuration.millis(), now), equalTo(TimeValue.timeValueMillis(0)));
}

public void testPreExpirationWithNullMin() throws Exception {
    int expirySeconds = randomIntBetween(5, 10);
    TimeValue expiryDuration = TimeValue.timeValueSeconds(expirySeconds);
    TimeValue max = TimeValue.timeValueSeconds(expirySeconds + randomIntBetween(1, 10));

    final ExpirationCallback.Pre pre = new NoopPreExpirationCallback(null, max, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(pre.delay(expiryDuration.millis() + now, now), equalTo(TimeValue.timeValueMillis(0)));
}

public void testPreExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());

```

```

    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

public void testPostExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPostExpirationCallback pre = new NoopPostExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

private void assertExpirationCallbackDelay(ExpirationCallback expirationCallback, long expiryDuration,
int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    // bounds
    assertThat(expirationCallback.delay(expiryDate, now + earliestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
    assertThat(expirationCallback.delay(expiryDate, now + latestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
    // in match
    assertThat(expirationCallback.delay(expiryDate,
now + randomIntBetween(earliestValidTriggerDelay, latestValidTriggerDelay)),
equalTo(TimeValue.timeValueMillis(0)));
    // out of bounds
    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay);
    assertThat(expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch),
equalTo(TimeValue.timeValueMillis(earliestValidTriggerDelay - deltaBeforeEarliestMatch)));
    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
    assertThat(expirationCallback.delay(expiryDate, expiryDate + deltaAfterLatestMatch), nullValue());
}

public void assertExpirationCallbackScheduleTime(ExpirationCallback expirationCallback, long expiryDuration,
int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    int validTriggerInterval = between(earliestValidTriggerDelay, latestValidTriggerDelay);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
now + validTriggerInterval, now + validTriggerInterval),
equalTo(now + validTriggerInterval));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + validTriggerInterval),
equalTo(now + validTriggerInterval + expirationCallback.getFrequency()));
}

```

```

    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay - 1);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now +
deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaBeforeEarliestMatch, now + deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));

    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + deltaAfterLatestMatch),
        equalTo(-1L));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaAfterLatestMatch, now + deltaAfterLatestMatch),
        equalTo(-1L));
}

private static class NoopPostExpirationCallback extends ExpirationCallback.Post {

    NoopPostExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}

private static class NoopPreExpirationCallback extends ExpirationCallback.Pre {

    NoopPreExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import com.carrotsearch.randomizedtesting.RandomizedTest;

```



```

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.licensor.LicenseSigner;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;
import org.junit.Assert;

import java.io.IOException;
import java.io.InputStream;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardCopyOption;
import java.util.ArrayList;
import java.util.List;
import java.util.UUID;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReference;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static org.apache.lucene.util.LuceneTestCase.createTempFile;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomAlphaOfLength;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.elasticsearch.test.ESTestCase.randomIntBetween;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.junit.Assert.assertThat;

public class TestUtils {

    private static final FormatDateTimeFormatter formatDateTimeFormatter = Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser = new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }
}

```

```

public static long dateMath(String time, final long now) {
    return dateMathParser.parse(time, () -> now);
}

public static LicenseSpec generateRandomLicenseSpec(int version) {
    boolean datesInMillis = randomBoolean();
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    String feature = "feature__" + randomInt();
    String issuer = "issuer__" + randomInt();
    String issuedTo = "issuedTo__" + randomInt();
    final String type;
    final String subscriptionType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        subscriptionType = randomFrom("gold", "silver", "platinum");
        type = "subscription";//randomFrom("subscription", "internal", "development");
    } else {
        subscriptionType = null;
        type = randomFrom("basic", "dev", "gold", "silver", "platinum");
    }
    int maxNodes = RandomizedTest.randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(version, uid, feature, issueDateInMillis, expiryDateInMillis, type, subscriptionType,
issuedTo, issuer,
        maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(version, uid, feature, issueDate, expiryDate, type, subscriptionType, issuedTo,
issuedTo, issuer, maxNodes);
    }
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startArray("licenses");
    licenses.startObject()
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);
}

```

```

if (licenseSpec.issueDate != null) {
    licenses.field("issue_date", licenseSpec.issueDate);
} else {
    licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
}
if (licenseSpec.expiryDate != null) {
    licenses.field("expiry_date", licenseSpec.expiryDate);
} else {
    licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
}
licenses.field("version", licenseSpec.version);
licenses.endObject();
licenses.endArray();
licenses.endObject();
return Strings.toString(licenses);
}

public static License generateLicenses(LicenseSpec spec) {
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)
        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }
    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }
    return builder.build();
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {

```

```

        MatcherAssert.assertThat(license.issueDate(), equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(String issueDate, String expiryDate) {
        this(License.VERSION_CURRENT, UUID.randomUUID().toString(), "feature", issueDate, expiryDate,
            "trial", "none", "customer",
            "elasticsearch", 5);
    }

    public LicenseSpec(int version, String uid, String feature, long issueDateInMillis, long expiryDateInMillis,
        String type,
        String subscriptionType, String issuedTo, String issuer, int maxNodes) {
        this.version = version;
        this.feature = feature;
        this.issueDateInMillis = issueDateInMillis;
        this.issueDate = null;
        this.expiryDateInMillis = expiryDateInMillis;
        this.expiryDate = null;
        this.uid = uid;
        this.type = type;
        this.subscriptionType = subscriptionType;
        this.issuedTo = issuedTo;
        this.issuer = issuer;
        this.maxNodes = maxNodes;
    }
}

```

```

public LicenseSpec(int version, String uid, String feature, String issueDate, String expiryDate, String type,
    String subscriptionType, String issuedTo, String issuer, int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}
}

public static Path getTestPriKeyPath() throws Exception {
    return getResourcePath("/private.key");
}

public static Path getTestPubKeyPath() throws Exception {
    return getResourcePath("/public.key");
}

public static String dumpLicense(License license) throws Exception {
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    builder.startObject();
    builder.startObject("license");
    license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    return Strings.toString(builder);
}

public static License generateSignedLicense(TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, -1, expiryDuration);
}

public static License generateSignedLicense(String type, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(type, -1, expiryDuration);
}

public static License generateSignedLicense(long issueDate, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, issueDate, expiryDuration);
}

public static License generateSignedLicense(String type, long issueDate, TimeValue expiryDuration) throws

```

```

Exception {
    return generateSignedLicense(type, randomIntBetween(License.VERSION_START,
License.VERSION_CURRENT), issueDate, expiryDuration);
}

/**
 * This method which chooses the license type randomly if the type is null. However, it will not randomly
 * choose trial or basic types as those types can only be self-generated.
 */
public static License generateSignedLicense(String type, int version, long issueDate, TimeValue expiryDuration)
throws Exception {
    long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() -
TimeValue.timeValueHours(2).getMillis();
    final String licenseType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        licenseType = randomFrom("subscription", "internal", "development");
    } else {
        licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
    }
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(version)
        .expiryDate(System.currentTimeMillis() + expiryDuration.getMillis())
        .issueDate(issue)
        .type(licenseType)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType((type != null) ? type : randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateSignedLicense(License.Builder builder) throws Exception {
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateExpiredNonBasicLicense(long expiryDate) throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"), expiryDate);
}

public static License generateExpiredNonBasicLicense() throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

```

```

public static License generateExpiredNonBasicLicense(String type) throws Exception {
    return generateExpiredNonBasicLicense(type,
        System.currentTimeMillis() - TimeValue.timeValueHours(randomIntBetween(1, 10)).getMillis());
}

public static License generateExpiredNonBasicLicense(String type, long expiryDate) throws Exception {
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(expiryDate)
        .issueDate(expiryDate - TimeValue.timeValueMinutes(10).getMillis())
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

private static Path getResourcePath(String resource) throws Exception {
    Path resourceFile = createTempFile();
    try (InputStream resourceInput = TestUtils.class.getResourceAsStream(resource)) {
        Files.copy(resourceInput, resourceFile, StandardCopyOption.REPLACE_EXISTING);
    }
    return resourceFile;
}

public static void registerAndAckSignedLicenses(final LicenseService licenseService, License license,
        final LicensesStatus expectedStatus) {
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(license).acknowledge(true);
    final CountdownLatch latch = new CountdownLatch(1);
    final AtomicReference<LicensesStatus> status = new AtomicReference<>();
    licenseService.registerLicense(putLicenseRequest, new ActionListener<PutLicenseResponse>() {
        @Override
        public void onResponse(PutLicenseResponse licensesUpdateResponse) {
            status.set(licensesUpdateResponse.status());
            latch.countDown();
        }

        @Override
        public void onFailure(Exception e) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {

```

```

        Assert.fail(e.getMessage());
    }
    assertThat(status.get(), equalTo(expectedStatus));
}

public static class AssertingLicenseState extends XPackLicenseState {
    public final List<License.OperationMode> modeUpdates = new ArrayList<>();
    public final List<Boolean> activeUpdates = new ArrayList<>();
    public final List<Version> trialVersionUpdates = new ArrayList<>();

    public AssertingLicenseState() {
        super(Settings.EMPTY);
    }

    @Override
    void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
        modeUpdates.add(mode);
        activeUpdates.add(active);
        trialVersionUpdates.add(mostRecentTrialVersion);
    }
}

/**
 * A license state that makes the {@link #update(License.OperationMode, boolean, Version)}
 * method public for use in tests.
 */
public static class UpdatableLicenseState extends XPackLicenseState {
    public UpdatableLicenseState() {
        this(Settings.EMPTY);
    }

    public UpdatableLicenseState(Settings settings) {
        super(settings);
    }

    @Override
    public void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
        super.update(mode, active, mostRecentTrialVersion);
    }
}

public static void putLicense(MetaData.Builder builder, License license) {
    builder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
}
}
/**
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;

```



```

* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.common.unit.TimeValue.timeValueHours;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicensesAcknowledgementTests extends AbstractLicenseServiceTestCase {

    public void testAcknowledgment() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(TestUtils.generateSignedLicense("gold", timeValueHours(2)), licenseState, Settings.EMPTY);
        licenseService.start();
        // try installing a signed license
        long issueDate = System.currentTimeMillis() - TimeValue.timeValueHours(24 * 2).getMillis();
        License signedLicense = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, issueDate,
timeValueHours(10));
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
        // ensure acknowledgement message was part of the response
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
        assertThat(licenseService.getLicense(), not(signedLicense));
        verify(clusterService, times(0)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

        // try installing a signed license with acknowledgement
        putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
        // ensure license was installed and no acknowledgment message was returned
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
        verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
    }

    public void testRejectUpgradeToProductionWithoutTLS() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.EMPTY);
        licenseService.start();
        // try installing a signed license
        License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);

```

```

// ensure acknowledgement message was part of the response
IllegalStateException ise = expectThrows(IllegalStateException.class, () ->
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true)));
    assertEquals("Cannot install a [PLATINUM] license unless TLS is configured or security is disabled",
ise.getMessage());
}

public void testUpgradeToProductionWithoutTLSAndSecurityDisabled() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", false).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testUpgradeToProductionWithTLSAndSecurity() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", true)
        .put("xpack.security.transport.ssl.enabled", true).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
}

```

```

        verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
    }

    private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
        private final boolean expectedAcknowledgement;
        private final LicensesStatus expectedStatus;
        private final boolean expectAckMessages;

        AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
            boolean expectAckMessages) {
            this.expectedAcknowledgement = expectedAcknowledgement;
            this.expectedStatus = expectedStatus;
            this.expectAckMessages = expectAckMessages;
        }

        @Override
        public void onResponse(PutLicenseResponse licensesUpdateResponse) {
            assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
            assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
            assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
        }

        @Override
        public void onFailure(Exception throwable) {
            throw new RuntimeException(throwable);
        }
    }
}

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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.Before;

import java.util.Collection;
import java.util.Collections;

```

```

import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicBoolean;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;

public class LicensesManagerServiceTests extends ESSingleNodeTestCase {

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        return Settings.builder()
            .put(super.nodeSettings())
            .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
            .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
            .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
            .put(XPackSettings.GRAPH_ENABLED.getKey(), false)
            .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
            .build();
    }

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Before
    public void waitForTrialLicenseToBeGenerated() throws Exception {
        assertBusy(() ->
assertNotNull(getInstanceFromNode(ClusterService.class).state().metaData().custom(LicensesMetaData.TYPE)));
    }

    public void testStoreAndGetLicenses() throws Exception {
        LicenseService licenseService = getInstanceFromNode(LicenseService.class);
        ClusterService clusterService = getInstanceFromNode(ClusterService.class);
        License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueHours(1));
        TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
        License silverLicense = TestUtils.generateSignedLicense("silver", TimeValue.timeValueHours(2));
        TestUtils.registerAndAckSignedLicenses(licenseService, silverLicense, LicensesStatus.VALID);
        License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueHours(1));
        TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
        LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
        assertThat(licensesMetaData.getLicense(), equalTo(platinumLicense));
        final License getLicenses = licenseService.getLicense();
    }
}

```

```

    assertThat(getLicenses, equalTo(platinumLicense));
}

// TODO: Add test/feature blocking the registration of basic license

public void testEffectiveLicenses() throws Exception {
    final LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    final ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueSeconds(5));
    // put gold license
    TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(goldLicense));

    License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueSeconds(3));
    // put platinum license
    TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(platinumLicense));
}

public void testInvalidLicenseStorage() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License signedLicense = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    TestUtils.registerAndAckSignedLicenses(licenseService, tamperedLicense, LicensesStatus.INVALID);

    // ensure that the invalid license never made it to cluster state
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), not(equalTo(tamperedLicense)));
}

public void testRemoveLicenses() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);

    // generate signed licenses
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(1));
    TestUtils.registerAndAckSignedLicenses(licenseService, license, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);

```

```

assertThat(licensesMetaData.getLicense(), not(LicensesMetaData.LICENSE_TOMBSTONE));

// remove signed licenses
removeAndAckSignedLicenses(licenseService);
licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

private void removeAndAckSignedLicenses(final LicenseService licenseService) {
    final CountdownLatch latch = new CountdownLatch(1);
    final AtomicBoolean success = new AtomicBoolean(false);
    licenseService.removeLicense(new DeleteLicenseRequest(), new
ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            if (clusterStateUpdateResponse.isAcknowledged()) {
                success.set(true);
            }
            latch.countDown();
        }

        @Override
        public void onFailure(Exception throwable) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {
        fail(e.getMessage());
    }
    assertThat("remove license(s) failed", success.get(), equalTo(true));
}
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.threadpool.TestThreadPool;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.After;
import org.junit.Before;

```

```

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;

import static org.hamcrest.Matchers.equalTo;

public class OperationModeFileWatcherTests extends ESTestCase {
    private ResourceWatcherService watcherService;
    private TestThreadPool threadPool;
    private Path licenseModePath;
    private OperationModeFileWatcher operationModeFileWatcher;
    private AtomicReference<CountDownLatch> onChangeCounter;

    @Before
    public void setup() throws Exception {
        threadPool = new TestThreadPool("license mode file watcher tests");
        Settings settings = Settings.builder()
            .put("resource.reload.interval.high", "10ms")
            .build();
        watcherService = new ResourceWatcherService(settings,
            threadPool);
        watcherService.start();
        licenseModePath = createTempFile();
        onChangeCounter = new AtomicReference<>(new CountDownLatch(1));
        operationModeFileWatcher = new OperationModeFileWatcher(watcherService, licenseModePath, logger,
            () -> onChangeCounter.get().countDown());
    }

    @After
    public void shutdown() throws InterruptedException {
        terminate(threadPool);
        watcherService.stop();
    }

    public void testInit() throws Exception {
        onChangeCounter.set(new CountDownLatch(2));
        writeMode("gold");
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
            equalTo(License.OperationMode.PLATINUM));
        operationModeFileWatcher.init();
        assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
        assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    }
}

```

```

public void testUpdateModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));
    writeMode("basic");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.BASIC));
}

```

```

public void testDeleteModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));

```

```

    Files.delete(licenseModePath);
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

```

```

public void testInvalidModeFromFile() throws Exception {
    writeMode("invalid");
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

```

```

public void testLicenseModeFileIsDirectory() throws Exception {
    licenseModePath = createTempDir();
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

```



```

    public void testLicenseModeFileCreatedAfterInit() throws Exception {
        Files.delete(licenseModePath);
        operationModeFileWatcher.init();
        assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
        onChangeCounter.set(new CountdownLatch(1));
        Path tempFile = createTempFile();
        writeMode("gold", tempFile);
        licenseModePath = tempFile;
        assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
        assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    }

    private void writeMode(String mode) throws IOException {
        writeMode(mode, licenseModePath);
    }

    static void writeMode(String mode, Path file) throws IOException {
        Files.write(file, mode.getBytes(StandardCharsets.UTF_8), StandardOpenOption.CREATE);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;

import java.util.Locale;

import static org.elasticsearch.license.License.OperationMode;
import static org.hamcrest.Matchers.equalTo;

/**
 * Tests {@link License.OperationMode} for correctness.
 * <p>
 * If you change the behavior of these tests, then it means that licensing changes across the products!
 */
public class LicenseOperationModeTests extends ESTestCase {
    public void testResolveTrial() {
        // assert 1.x BWC
        assertResolve(OperationMode.TRIAL, "nONE", "DEv", "deveLopment");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.TRIAL, "tRiAl", "trial");
    }
}

```

```

public void testResolveBasic() {
    // assert expected (2.x+) variant (note: no 1.x variant of BASIC)
    assertResolve(OperationMode.BASIC, "bAsIc", "basic");
}

public void testResolveStandard() {
    // assert expected (2.x+) variant (note: no 1.x variant of STANDARD)
    assertResolve(OperationMode.STANDARD, "StAnDARd", "standard");
}

public void testResolveGold() {
    // assert expected (2.x+) variant (note: no different 1.x variant of GOLD)
    assertResolve(OperationMode.GOLD, "SiLvEr", "gOId", "silver", "gold");
}

public void testResolvePlatinum() {
    // assert 1.x BWC
    assertResolve(OperationMode.PLATINUM, "iNtErNaL");
    // assert expected (2.x+) variant
    assertResolve(OperationMode.PLATINUM, "PlAtINum", "platinum");
}

public void testResolveUnknown() {
    // 'enterprise' is a type that exists in cloud but should be rejected under normal operation
    // See https://github.com/elastic/x-plugins/issues/3371
    String[] types = { "unknown", "fake", "enterprise" };

    for (String type : types) {
        try {
            OperationMode.resolve(type);

            fail(String.format(Locale.ROOT, "[%s] should not be recognized as an operation mode", type));
        }
        catch (IllegalArgumentException e) {
            assertThat(e.getMessage(), equalTo("unknown type [" + type + "]"));
        }
    }
}

private static void assertResolve(OperationMode expected, String... types) {
    for (String type : types) {
        assertThat(OperationMode.resolve(type), equalTo(expected));
    }
}
/*
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```

```

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*/
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;

import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes =
0, transportClientRatio = 0,
    autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return nodeSettingsBuilder(nodeOrdinal).build();
    }

    private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put("resource.reload.interval.high", "500ms") // for license mode file watcher
            .put(NetworkModule.HTTP_ENABLED.getKey(), true);
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return nodePlugins();
    }

    public void testClusterNotRecovered() throws Exception {

```

```

        logger.info("--> start one master out of two [recovery state]");
        internalCluster().startNode(nodeSettingsBuilder(0).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
        logger.info("--> start second master out of two [recovered state]");
        internalCluster().startNode(nodeSettingsBuilder(1).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
        assertLicenseActive(true);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterModule;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.metadata.RepositoriesMetaData;
import org.elasticsearch.cluster.metadata.RepositoryMetaData;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContent.Params;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.test.ESTestCase;

import java.util.Collections;
import java.util.UUID;
import java.util.stream.Collectors;
import java.util.stream.Stream;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.notNullValue;
import static org.hamcrest.Matchers.nullValue;

public class LicensesMetaDataSerializationTests extends ESTestCase {

    public void testXContentSerializationOneSignedLicense() throws Exception {
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, null);
        XContentBuilder builder = XContentFactory.jsonBuilder();
        builder.startObject();
        builder.startObject("licenses");

```

```

licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.endObject();
builder.endObject();
LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
assertNull(licensesMetaDataFromXContent.getMostRecentTrialVersion());
}

public void testXContentSerializationOneSignedLicenseWithUsedTrial() throws Exception {
License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
XContentBuilder builder = XContentFactory.jsonBuilder();
builder.startObject();
builder.startObject("licenses");
licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.endObject();
builder.endObject();
LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

public void testLicenseMetadataParsingDoesNotSwallowOtherMetadata() throws Exception {
new Licensing(Settings.EMPTY); // makes sure LicensePlugin is registered in Custom Metadata
License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
RepositoryMetaData repositoryMetaData = new RepositoryMetaData("repo", "fs", Settings.EMPTY);
RepositoriesMetaData repositoriesMetaData = new RepositoriesMetaData(repositoryMetaData);
final Metadata.Builder metaDataBuilder = Metadata.builder();
if (randomBoolean()) { // random order of insertion
metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
} else {
metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
}
// serialize metadata
XContentBuilder builder = XContentFactory.jsonBuilder();
Params params = new
ToXContent.MapParams(Collections.singletonMap(Metadata.CONTEXT_MODE_PARAM,
Metadata.CONTEXT_MODE_GATEWAY));
builder.startObject();
builder = metaDataBuilder.build().toXContent(builder, params);
builder.endObject();
// deserialize metadata again
Metadata metaData = Metadata.Builder.fromXContent(createParser(builder));

```

```

// check that custom metadata still present
assertThat(metaData.custom(licensesMetaData.getWriteableName()), notNullValue());
assertThat(metaData.custom(repositoriesMetaData.getWriteableName()), notNullValue());
}

public void testXContentSerializationOneTrial() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .type(randomBoolean() ? "trial" : "basic")
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
    final License trialLicense = SelfGeneratedLicense.create(specBuilder);
    LicensesMetaData licensesMetaData = new LicensesMetaData(trialLicense, Version.CURRENT);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(trialLicense));
    assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

public void testLicenseTombstoneFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

public void testLicenseTombstoneWithUsedTrialFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.field("trial_license", Version.CURRENT.toString());
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
}

```

```

        assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
        assertEquals(metaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
    }

    private static LicensesMetaData getLicensesMetaDataFromXContent(XContentParser parser) throws Exception {
        parser.nextToken(); // consume null
        parser.nextToken(); // consume "licenses"
        LicensesMetaData licensesMetaDataFromXContent = LicensesMetaData.fromXContent(parser);
        parser.nextToken(); // consume endObject
        assertThat(parser.nextToken(), nullValue());
        return licensesMetaDataFromXContent;
    }

    @Override
    protected NamedXContentRegistry xContentRegistry() {
        return new NamedXContentRegistry(Stream.concat(
            new Licensing(Settings.EMPTY).getNamedXContent().stream(),
            ClusterModule.getNamedXWriteables().stream()
        ).collect(Collectors.toList()));
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.settings.Settings;
import org.mockito.ArgumentCaptor;
import org.mockito.Mockito;

import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseRegistrationTests extends AbstractLicenseServiceTestCase {

    public void testSelfGeneratedTrialLicense() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(null, licenseState, Settings.EMPTY, "trial");
    }
}

```

```

when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

ClusterState state = ClusterState.builder(new ClusterName("a")).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertFalse(licenseMetaData.isEligibleForTrial());
assertEquals("trial", licenseMetaData.getLicense().type());
assertEquals(clock.millis() +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis(),
licenseMetaData.getLicense().expiryDate());
}

public void testSelfGeneratedBasicLicense() throws Exception {
XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(null, licenseState, Settings.EMPTY, "basic");
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

ClusterState state = ClusterState.builder(new ClusterName("a")).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
}

public void testNonSelfGeneratedBasicLicenseIsReplaced() throws Exception {
long now = System.currentTimeMillis();
String uid = UUID.randomUUID().toString();
final License.Builder builder = License.builder()
.uid(uid)
.version(License.VERSION_CURRENT)
.expiryDate(dateMath("now+2h", now))
.startDate(now)
.issueDate(now)
.type("basic")

```



```

        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
License license = TestUtils.generateSignedLicense(builder);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    assertEquals(uid, licenseMetaData.getLicense().uid());
}

public void testExpiredSelfGeneratedBasicLicenseIsExtended() throws Exception {
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    License.Builder builder = License.builder()
        .uid(uid)
        .issuedTo("name")
        .maxNodes(1000)
        .issueDate(dateMath("now-10h", now))
        .type("basic")
        .expiryDate(dateMath("now-2h", now));
License license = SelfGeneratedLicense.create(builder);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =

```

```

ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertTrue(licenseMetaData.isEligibleForTrial());
    assertEquals("basic", licenseMetaData.getLicense().type());
    assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    assertEquals(uid, licenseMetaData.getLicense().uid());
    }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.CryptUtils.encrypt;
import static org.hamcrest.Matchers.equalTo;

public class SelfGeneratedLicenseTests extends ESTestCase {

    public void testBasic() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .maxNodes(5)
            .type(randomBoolean() ? "trial" : "basic")
            .issueDate(issueDate)

```

```

        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License trialLicense = SelfGeneratedLicense.create(specBuilder);
assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
}

public void testTampered() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .type(randomBoolean() ? "trial" : "basic")
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License trialLicense = SelfGeneratedLicense.create(specBuilder);
final String originalSignature = trialLicense.signature();
License tamperedLicense = License.builder().fromLicenseSpec(trialLicense, originalSignature)
    .expiryDate(System.currentTimeMillis() + TimeValue.timeValueHours(5).getMillis())
    .build();
assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
assertThat(SelfGeneratedLicense.verify(tamperedLicense), equalTo(false));
}

public void testFrom1x() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .type("subscription")
        .subscriptionType("trial")
        .issuer("elasticsearch")
        .feature("")
        .version(License.VERSION_START)
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License pre20TrialLicense = specBuilder.build();
License license =
SelfGeneratedLicense.create(License.builder().fromPre20LicenseSpec(pre20TrialLicense).type("trial"));
assertThat(SelfGeneratedLicense.verify(license), equalTo(true));
}

public void testTrialLicenseVerifyWithOlderVersion() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)

```

```

        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis())
        .feature("")
        .subscriptionType("trial")
        .version(1);
License trialLicenseV1 = createTrialLicense(specBuilder);
assertThat(SelfGeneratedLicense.verify(trialLicenseV1), equalTo(true));
}

private static License createTrialLicense(License.Builder specBuilder) {
    License spec = specBuilder
        .type(randomBoolean() ? "trial" : "basic")
        .issuer("elasticsearch")
        .uid(UUID.randomUUID().toString())
        .build();
    final String signature;
    try {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        byte[] bytes = new byte[4 + 4 + encrypt.length];
        ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
        byteBuffer.putInt(-spec.version())
            .putInt(encrypt.length)
            .put(encrypt);
        signature = Base64.getEncoder().encodeToString(bytes);
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
    return License.builder().fromLicenseSpec(spec, signature).build();
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionFuture;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;

```

```

import org.elasticsearch.xpack.core.XPackSettings;

import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.elasticsearch.license.TestUtils.generateExpiredNonBasicLicense;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.not;

public class LicensesTransportTests extends ESSingleNodeTestCase {

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        Settings.Builder newSettings = Settings.builder();
        newSettings.put(super.nodeSettings());
        newSettings.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
        // newSettings.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
        // newSettings.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
        newSettings.put(Node.NODE_DATA_SETTING.getKey(), true);
        return newSettings.build();
    }

    public void testEmptyGetLicense() throws Exception {
        // basic license is added async, we should wait for it
        assertBusy(() -> {
            try {
                final ActionFuture<GetLicenseResponse> getLicenseFuture =
                    new GetLicenseRequestBuilder(client().admin().cluster(), GetLicenseAction.INSTANCE).execute();
                final GetLicenseResponse getLicenseResponse;
                getLicenseResponse = getLicenseFuture.get();
                assertNotNull(getLicenseResponse.license());
                assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
            } catch (Exception e) {
                throw new RuntimeException("unexpected exception", e);
            }
        });
    }
}

```

```

    }
    });
}

public void testPutLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // put license
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(signedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutLicenseFromString() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
    String licenseString = TestUtils.dumpLicense(signedLicense);

    // put license source
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE)
        .setLicense(new ByteArray(licenseString.getBytes(StandardCharsets.UTF_8)),
XContentType.JSON)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutInvalidLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())

```

```

        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(tamperedLicense);

    // try to put license (should be invalid)
    final PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(tamperedLicense));
}

public void testPutBasicLicenseIsInvalid() throws Exception {
    License signedLicense = generateSignedLicense("basic", License.VERSION_CURRENT, -1,
TimeValue.timeValueMinutes(2));

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(signedLicense);

    // try to put license (should be invalid)
    IllegalArgumentException iae = expectThrows(IllegalArgumentException.class, builder::get);
    assertEquals(iae.getMessage(), "Registering basic licenses is not allowed.");

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(signedLicense));
}

public void testPutExpiredLicense() throws Exception {
    License expiredLicense = generateExpiredNonBasicLicense();
    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(expiredLicense);
    PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.EXPIRED));
    // get license should not return the expired license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(expiredLicense));
}

```

```

public void testPutLicensesSimple() throws Exception {
    License goldSignedLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldSignedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(goldSignedLicense));

    License platinumSignedLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(2));
    putLicenseRequestBuilder.setLicense(platinumSignedLicense);
    putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(platinumSignedLicense));
}

```

```

public void testRemoveLicensesSimple() throws Exception {
    License goldLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(goldLicense));
    // delete all licenses
    DeleteLicenseRequestBuilder deleteLicenseRequestBuilder =
        new DeleteLicenseRequestBuilder(client().admin().cluster(), DeleteLicenseAction.INSTANCE);
    DeleteLicenseResponse deleteLicenseResponse = deleteLicenseRequestBuilder.get();
    assertThat(deleteLicenseResponse.isAcknowledged(), equalTo(true));
    // get licenses (expected no licenses)
    getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertNull(getLicenseResponse.license());
}

```

```

public void testLicenseIsRejectWhenStartDateLaterThanNow() throws Exception {
    long now = System.currentTimeMillis();

```



```

final License.Builder builder = License.builder()
    .uid(UUID.randomUUID().toString())
    .version(License.VERSION_CURRENT)
    .expiryDate(dateMath("now+2h", now))
    .startDate(dateMath("now+1h", now))
    .issueDate(now)
    .type(License.OperationMode.TRIAL.toString())
    .issuedTo("customer")
    .issuer("elasticsearch")
    .maxNodes(5);
License license = TestUtils.generateSignedLicense(builder);

PutLicenseRequestBuilder putLicenseRequestBuilder =
    new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
    .setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));
}

public void testLicenseIsAcceptedWhenStartDateBeforeThanNow() throws Exception {
    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(now)
        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);

    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.

```

```

*/
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.unit.TimeValue;

import java.net.InetAddress;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicenseTLSTests extends AbstractLicenseServiceTestCase {

    private InetAddress inetAddress;

    public void testApplyLicenseInDevMode() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "platinum"),
TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();
        request.acknowledge(true);
        request.license(newLicense);
        Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
        XPackLicenseState licenseState = new XPackLicenseState(settings);
        inetAddress = InetAddress.getLoopbackAddress();

        setInitialState(null, licenseState, settings);
        licenseService.start();
        PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
        licenseService.registerLicense(request, responseFuture);
        verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

        inetAddress = TransportAddress.META_ADDRESS;
        settings = Settings.builder()
            .put("xpack.security.enabled", true)
            .put("discovery.type", "single-node")
            .build();
        licenseService.stop();
        licenseState = new XPackLicenseState(settings);
        setInitialState(null, licenseState, settings);
    }
}

```

```

licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testApplyLicenseInProdMode() throws Exception {
    final String licenseType = randomFrom("GOLD", "PLATINUM");
    License newLicense = TestUtils.generateSignedLicense(licenseType, TimeValue.timeValueHours(24L));
    PutLicenseRequest request = new PutLicenseRequest();
    request.acknowledge(true);
    request.license(newLicense);
    Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
    XPackLicenseState licenseState = new XPackLicenseState(settings);
    InetAddress inetAddress = TransportAddress.META_ADDRESS;

    setInitialState(null, licenseState, settings);
    licenseService.start();
    PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
    IllegalStateException e = expectThrows(IllegalStateException.class, () ->
licenseService.registerLicense(request, responseFuture));
    assertThat(e.getMessage(),
        containsString("Cannot install a [" + licenseType + "] license unless TLS is configured or security is
disabled"));

    settings = Settings.builder().put("xpack.security.enabled", false).build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
    licenseService.start();
    licenseService.registerLicense(request, responseFuture);
    verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    settings = Settings.builder()
        .put("xpack.security.enabled", true)
        .put("xpack.security.transport.ssl.enabled", true)
        .build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
    licenseService.start();
    licenseService.registerLicense(request, responseFuture);
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

@Override
protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("localnode", new TransportAddress(inetAddress, randomIntBetween(9300, 9399)),
        emptyMap(), emptySet(), Version.CURRENT);
}

```

```

    }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.nio.charset.StandardCharsets;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;

import static org.hamcrest.core.IsEqual.equalTo;
import static org.hamcrest.core.IsNull.notNullValue;
import static org.hamcrest.core.IsNull.nullValue;

public class LicenseSerializationTests extends ESTestCase {
    public void testSimpleIssueExpiryDate() throws Exception {
        long now = System.currentTimeMillis();
        String issueDate = TestUtils.dateMathString("now", now);
        String expiryDate = TestUtils.dateMathString("now+10d/d", now);
        String licenseSpecs = TestUtils.generateLicenseSpecString(new TestUtils.LicenseSpec(issueDate, expiryDate));
        License generatedLicense = License.fromSource(new
        BytesArray(licenseSpecs.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
        assertThat(generatedLicense.issueDate(), equalTo(DateUtils.beginningOfDay(issueDate)));
        assertThat(generatedLicense.expiryDate(), equalTo(DateUtils.endOfDay(expiryDate)));
    }

    public void testLicensesFields() throws Exception {
        TestUtils.LicenseSpec randomLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_START);
        String licenseSpecsSource = TestUtils.generateLicenseSpecString(randomLicenseSpec);
        final License fromSource =
            License.fromSource(new BytesArray(licenseSpecsSource.getBytes(StandardCharsets.UTF_8)),
        XContentType.JSON);
        TestUtils.assertLicenseSpec(randomLicenseSpec, fromSource);
    }
}

```

```

public void testLicenseRestView() throws Exception {
    long now = System.currentTimeMillis();
    String expiredLicenseExpiryDate = TestUtils.dateMathString("now-1d/d", now);
    String validLicenseIssueDate = TestUtils.dateMathString("now-10d/d", now);
    String invalidLicenseIssueDate = TestUtils.dateMathString("now+1d/d", now);
    String validLicenseExpiryDate = TestUtils.dateMathString("now+2d/d", now);

    License license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
expiredLicenseExpiryDate));
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();

    // should have an extra status field, human readable issue_data and expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), notNullValue());
    assertThat(map.get("status"), equalTo("expired"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
    assertThat(map.get("status"), nullValue());

    license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
validLicenseExpiryDate));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

    // should have an extra status field, human readable issue_data and expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), notNullValue());
    assertThat(map.get("status"), equalTo("active"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
    assertThat(map.get("status"), nullValue());

    license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(invalidLicenseIssueDate,

```

```

validLicenseExpiryDate));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());

    // should have an extra status field, human readable issue_data and expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), notNullValue());
    assertThat(map.get("status"), equalTo("invalid"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
    assertThat(map.get("status"), nullValue());
}

public void testLicenseRestViewNonExpiringBasic() throws Exception {
    long now = System.currentTimeMillis();

    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("test")
        .maxNodes(1000)
        .issueDate(now)
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License license = SelfGeneratedLicense.create(specBuilder);
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType().v2());

    // should have an extra status field, human readable issue_data and no expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("type"), equalTo("basic"));
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), nullValue());
    assertThat(map.get("expiry_date_in_millis"), nullValue());
    assertThat(map.get("status"), equalTo("active"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
}

```

```

        assertThat(map.get("status"), nullValue());
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartBasicLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
            .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override

```

```

protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
}

public void testStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
    licensingClient.preparePutLicense(license).get();

    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("trial", getLicenseResponse.license().type());
    });

    // Testing that you can start a basic license when you have no license
    if (randomBoolean()) {
        licensingClient.prepareDeleteLicense().get();
        assertNull(licensingClient.prepareGetLicense().get().license());
    }

    RestClient restClient = getRestClient();
    Response response = restClient.performRequest("GET", "/_xpack/license/basic_status");
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response.getStatusLine().getStatusCode());
    assertEquals("{\"eligible_to_start_basic\":true}", body);

    Response response2 = restClient.performRequest("POST", "/_xpack/license/start_basic?acknowledge=true");
    String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response2.getStatusLine().getStatusCode());
    assertTrue(body2.contains("\"acknowledged\":true"));
    assertTrue(body2.contains("\"basic_was_started\":true"));

    assertBusy(() -> {
        GetLicenseResponse currentLicense = licensingClient.prepareGetLicense().get();
        assertEquals("basic", currentLicense.license().type());
    });

    long expirationMillis = licensingClient.prepareGetLicense().get().license().expiryDate();
    assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
expirationMillis);

    Response response3 = restClient.performRequest("GET", "/_xpack/license");
    String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertTrue(body3.contains("\"type\" : \"basic\""));
}

```



```

assertFalse(body3.contains("expiry_date"));
assertFalse(body3.contains("expiry_date_in_millis"));

Response response4 = restClient.performRequest("GET", "/_xpack/license/basic_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_basic\":false}", body4);

ResponseException ex = expectThrows(ResponseException.class,
    () -> restClient.performRequest("POST", "/_xpack/license/start_basic"));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"basic_was_started\":false"));
assertTrue(body5.contains("\"acknowledged\":true"));
assertTrue(body5.contains("\"error_message\": \"Operation failed: Current license is basic.\""));
}

public void testUnacknowledgedStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
    licensingClient.preparePutLicense(license).get();

    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("trial", getLicenseResponse.license().type());
    });

    Response response2 = getRestClient().performRequest("POST", "/_xpack/license/start_basic");
    String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response2.getStatusLine().getStatusCode());
    assertTrue(body2.contains("\"acknowledged\":false"));
    assertTrue(body2.contains("\"basic_was_started\":false"));
    assertTrue(body2.contains("\"error_message\": \"Operation failed: Needs acknowledgement.\""));
    assertTrue(body2.contains("\"message\": \"This license update requires acknowledgement. To acknowledge the
license, " +
        "please read the following messages and call /start_basic again, this time with the
\\\"acknowledge=true\\\""));
    }
}
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```

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*/

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.BytesStreamOutput;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.test.ESTestCase;
```

```
import java.io.IOException;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
```

```
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.hamcrest.Matchers.sameInstance;
```

```
public class PutLicenseResponseTests extends ESTestCase {
    @SuppressWarnings("unchecked")
    public void testSerialization() throws Exception {
        boolean acknowledged = randomBoolean();
        LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
        Map<String, String[]> ackMessages = randomAckMessages();

        PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);

        XContentBuilder contentBuilder = XContentFactory.jsonBuilder();
        response.toXContent(contentBuilder, ToXContent.EMPTY_PARAMS);

        Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(contentBuilder), false,
            contentBuilder.contentType().v2());
        assertThat(map.containsKey("acknowledged"), equalTo(true));
        boolean actualAcknowledged = (boolean) map.get("acknowledged");
        assertThat(actualAcknowledged, equalTo(acknowledged));

        assertThat(map.containsKey("license_status"), equalTo(true));
        String actualStatus = (String) map.get("license_status");
        assertThat(actualStatus, equalTo(status.name().toLowerCase(Locale.ROOT)));

        assertThat(map.containsKey("acknowledge"), equalTo(true));
        Map<String, List<String>> actualAckMessages = (Map<String, List<String>>) map.get("acknowledge");
```

```

    assertTrue(actualAckMessages.containsKey("message"));
    actualAckMessages.remove("message");
    assertEquals(actualAckMessages.keySet(), equalTo(ackMessages.keySet()));
    for (Map.Entry<String, List<String>> entry : actualAckMessages.entrySet()) {
        assertEquals(entry.getValue().toArray(), ackMessages.get(entry.getKey()));
    }
}

public void testStreamSerialization() throws IOException {
    boolean acknowledged = randomBoolean();
    LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
    Map<String, String[]> ackMessages = randomAckMessages();

    // write the steam so that we can attempt to read it back
    ByteArrayOutputStream output = new ByteArrayOutputStream();

    PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);
    // write it out
    response.writeTo(output);

    StreamInput input = output.bytes().streamInput();

    // read it back in
    response.readFrom(input);

    assertEquals(response.isAcknowledged(), equalTo(acknowledged));
    assertEquals(response.status(), equalTo(status));
    assertEquals(response.acknowledgeMessages(), not(sameInstance(ackMessages)));
    assertEquals(response.acknowledgeMessages().size(), equalTo(ackMessages.size()));

    for (String key : ackMessages.keySet()) {
        assertEquals(ackMessages.get(key), response.acknowledgeMessages().get(key));
    }
}

private static Map<String, String[]> randomAckMessages() {
    int nFeatures = randomIntBetween(1, 5);

    Map<String, String[]> ackMessages = new HashMap<>();

    for (int i = 0; i < nFeatures; i++) {
        String feature = randomAlphaOfLengthBetween(9, 15);
        int nMessages = randomIntBetween(1, 5);
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = randomAlphaOfLengthBetween(10, 30);
        }
    }
}

```

```

        ackMessages.put(feature, messages);
    }

    return ackMessages;
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlocks;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.watcher.watch.ClockMock;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Path;
import java.util.Arrays;

import static java.util.Collections.emptySet;
import static java.util.Collections.singletonMap;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

public abstract class AbstractLicenseServiceTestCase extends ESTestCase {

    protected LicenseService licenseService;
    protected ClusterService clusterService;
    protected ResourceWatcherService resourceWatcherService;
    protected ClockMock clock;
    protected DiscoveryNodes discoveryNodes;
    protected Environment environment;
    protected String licenseType;

```

```

@Before
public void init() throws Exception {
    clusterService = mock(ClusterService.class);
    clock = ClockMock.frozen();
    discoveryNodes = mock(DiscoveryNodes.class);
    resourceWatcherService = mock(ResourceWatcherService.class);
    environment = mock(Environment.class);
}

protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings) {
    setInitialState(license, licenseState, settings, randomBoolean() ? "trial" : "basic");
}

protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings, String
selfGeneratedType) {
    Path tempDir = createTempDir();
    when(environment.configFile()).thenReturn(tempDir);
    licenseType = selfGeneratedType;
    settings =
Settings.builder().put(settings).put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(),
licenseType).build();
    licenseService = new LicenseService(settings, clusterService, clock, environment, resourceWatcherService,
licenseState);
    ClusterState state = mock(ClusterState.class);
    final ClusterBlocks noBlock = ClusterBlocks.builder().build();
    when(state.blocks()).thenReturn(noBlock);
    Metadata metaData = mock(Metadata.class);
    when(metaData.custom(LicensesMetaData.TYPE)).thenReturn(new LicensesMetaData(license, null));
    when(state.metaData()).thenReturn(metaData);
    final DiscoveryNode mockNode = getLocalNode();
    when(discoveryNodes.getMasterNode()).thenReturn(mockNode);
    when(discoveryNodes.splitIterator()).thenReturn(Arrays.asList(mockNode).splitIterator());
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(false);
    when(state.nodes()).thenReturn(discoveryNodes);
    when(state.getNodes()).thenReturn(discoveryNodes); // it is really ridiculous we have nodes() and getNodes()...
    when(clusterService.state()).thenReturn(state);
    when(clusterService.lifecycleState()).thenReturn(Lifecycle.State.STARTED);
    when(clusterService.getClusterName()).thenReturn(new ClusterName("a"));
    when(clusterService.localNode()).thenReturn(mockNode);
}

protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("b", buildNewFakeTransportAddress(),
singletonMap(XPackPlugin.XPACK_INSTALLED_NODE_ATTR, "true"),
emptySet(), Version.CURRENT);
}

```

```

    @After
    public void tearDown() throws Exception {
        super.tearDown();
        licenseService.stop();
    }
}
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.function.Predicate;

/**
 * A permissions that is based on a general privilege that contains patterns of users that this
 * user can execute a request as
 */
public final class RunAsPermission {

    public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

    private final Predicate<String> predicate;

    RunAsPermission(Privilege privilege) {
        this.predicate = privilege.predicate();
    }

    /**
     * Checks if this permission grants run as to the specified user
     */
    public boolean check(String username) {
        return predicate.test(username);
    }
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.bytes.BytesReference;

```

```

import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;

public final class Role {

    public static final Role EMPTY = Role.builder("__empty").build();

    private final String[] names;
    private final ClusterPermission cluster;
    private final IndicesPermission indices;
    private final RunAsPermission runAs;

    Role(String[] names, ClusterPermission cluster, IndicesPermission indices, RunAsPermission runAs) {
        this.names = names;
        this.cluster = Objects.requireNonNull(cluster);
        this.indices = Objects.requireNonNull(indices);
        this.runAs = Objects.requireNonNull(runAs);
    }

    public String[] names() {
        return names;
    }

    public ClusterPermission cluster() {
        return cluster;
    }

    public IndicesPermission indices() {
        return indices;
    }

    public RunAsPermission runAs() {
        return runAs;
    }

    public static Builder builder(String... names) {
        return new Builder(names, null);
    }

```

```

}

public static Builder builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(names, fieldPermissionsCache);
}

public static Builder builder(RoleDescriptor rd, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(rd, fieldPermissionsCache);
}

/**
 * Returns whether at least one group encapsulated by this indices permissions is authorized to execute the
 * specified action with the requested indices/aliases. At the same time if field and/or document level security
 * is configured for any group also the allowed fields and role queries are resolved.
 */
public IndicesAccessControl authorize(String action, Set<String> requestedIndicesOrAliases, MetaData
metaData,
                                FieldPermissionsCache fieldPermissionsCache) {
    Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = indices.authorize(
        action, requestedIndicesOrAliases, metaData, fieldPermissionsCache
    );

    // At least one role / indices permission set need to match with all the requested indices/aliases:
    boolean granted = true;
    for (Map.Entry<String, IndicesAccessControl.IndexAccessControl> entry : indexPermissions.entrySet()) {
        if (!entry.getValue().isGranted()) {
            granted = false;
            break;
        }
    }
    return new IndicesAccessControl(granted, indexPermissions);
}

public static class Builder {

    private final String[] names;
    private ClusterPermission cluster = ClusterPermission.NONE;
    private RunAsPermission runAs = RunAsPermission.NONE;
    private List<IndicesPermission.Group> groups = new ArrayList<>();
    private FieldPermissionsCache fieldPermissionsCache = null;

    private Builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
        this.names = names;
        this.fieldPermissionsCache = fieldPermissionsCache;
    }

    private Builder(RoleDescriptor rd, @Nullable FieldPermissionsCache fieldPermissionsCache) {
        this.names = new String[] { rd.getName() };

```



```

this.fieldPermissionsCache = fieldPermissionsCache;
if (rd.getClusterPrivileges().length == 0) {
    cluster = ClusterPermission.NONE;
} else {
    this.cluster(ClusterPrivilege.get(Sets.newHashSet(rd.getClusterPrivileges())));
}
groups.addAll(convertFromIndicesPrivileges(rd.getIndicesPrivileges(), fieldPermissionsCache));
String[] rdRunAs = rd.getRunAs();
if (rdRunAs != null && rdRunAs.length > 0) {
    this.runAs(new Privilege(Sets.newHashSet(rdRunAs), rdRunAs));
}
}

public Builder cluster(ClusterPrivilege privilege) {
    cluster = new ClusterPermission(privilege);
    return this;
}

public Builder runAs(Privilege privilege) {
    runAs = new RunAsPermission(privilege);
    return this;
}

public Builder add(IndexPrivilege privilege, String... indices) {
    groups.add(new IndicesPermission.Group(privilege, FieldPermissions.DEFAULT, null, indices));
    return this;
}

public Builder add(FieldPermissions fieldPermissions, Set<BytesReference> query, IndexPrivilege privilege,
String... indices) {
    groups.add(new IndicesPermission.Group(privilege, fieldPermissions, query, indices));
    return this;
}

public Role build() {
    IndicesPermission indices = groups.isEmpty() ? IndicesPermission.NONE :
        new IndicesPermission(groups.toArray(new IndicesPermission.Group[groups.size()]));
    return new Role(names, cluster, indices, runAs);
}

static List<IndicesPermission.Group> convertFromIndicesPrivileges(RoleDescriptor.IndicesPrivileges[]
indicesPrivileges,
                                @Nullable FieldPermissionsCache fieldPermissionsCache) {
    List<IndicesPermission.Group> list = new ArrayList<>(indicesPrivileges.length);
    for (RoleDescriptor.IndicesPrivileges privilege : indicesPrivileges) {
        final FieldPermissions fieldPermissions;
        if (fieldPermissionsCache != null) {
            fieldPermissions = fieldPermissionsCache.getFieldPermissions(privilege.getGrantedFields(),

```

```

privilege.getDeniedFields());
    } else {
        fieldPermissions = new FieldPermissions(
            new FieldPermissionsDefinition(privilege.getGrantedFields(), privilege.getDeniedFields()));
    }
    final Set<BytesReference> query = privilege.getQuery() == null ? null :
Collections.singleton(privilege.getQuery());
    list.add(new IndicesPermission.Group(IndexPrivilege.get(Sets.newHashSet(privilege.getPrivileges())),
        fieldPermissions,
        query,
        privilege.getIndices()));

    }
    return list;
    }
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.common.cache.Cache;
import org.elasticsearch.common.cache.CacheBuilder;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Setting.Property;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.Collection;
import java.util.List;
import java.util.Optional;
import java.util.Set;
import java.util.concurrent.ExecutionException;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.xpack.core.security.SecurityField.setting;

/**
 * A service for managing the caching of { @link FieldPermissions } as these may often need to be combined or
 * created and internally they
 * use an { @link org.apache.lucene.util.automaton.Automaton }, which can be costly to create once you account for

```

```

minimization
*/
public final class FieldPermissionsCache {

    public static final Setting<Long> CACHE_SIZE_SETTING = Setting.longSetting(
        setting("authz.store.roles.field_permissions.cache.max_size_in_bytes"), 100 * 1024 * 1024, -1L,
Property.NodeScope);
    private final Cache<FieldPermissionsDefinition, FieldPermissions> cache;

    public FieldPermissionsCache(Settings settings) {
        this.cache = CacheBuilder.<FieldPermissionsDefinition, FieldPermissions>builder()
            .setMaximumWeight(CACHE_SIZE_SETTING.get(settings))
            .weigher((key, fieldPermissions) -> fieldPermissions.ramBytesUsed())
            .build();
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
may come from the cache
     * or if it gets created, the instance will be cached
     */
    FieldPermissions getFieldPermissions(String[] granted, String[] denied) {
        return getFieldPermissions(new FieldPermissionsDefinition(granted, denied));
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
may come from the cache
     * or if it gets created, the instance will be cached
     */
    public FieldPermissions getFieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
        try {
            return cache.computeIfAbsent(fieldPermissionsDefinition,
                (key) -> new FieldPermissions(key, FieldPermissions.initializePermittedFieldsAutomaton(key)));
        } catch (ExecutionException e) {
            throw new ElasticsearchException("unable to compute field permissions", e);
        }
    }

    /**
     * Returns a field permissions object that corresponds to the merging of the given field permissions and caches the
instance if one was
     * not found in the cache.
     */
    FieldPermissions getFieldPermissions(Collection<FieldPermissions> fieldPermissionsCollection) {
        Optional<FieldPermissions> allowAllFieldPermissions = fieldPermissionsCollection.stream()
            .filter(((Predicate<FieldPermissions>) (FieldPermissions::hasFieldLevelSecurity)).negate())
            .findFirst();

```

```

return allowAllFieldPermissions.orElseGet() -> {
    final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups = fieldPermissionsCollection.stream()
        .flatMap(fieldPermission ->
fieldPermission.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream())
        .collect(Collectors.toSet());
    final FieldPermissionsDefinition combined = new FieldPermissionsDefinition(fieldGrantExcludeGroups);
    try {
        return cache.computeIfAbsent(combined, (key) -> {
            List<Automaton> automatonList = fieldPermissionsCollection.stream()
                .map(FieldPermissions::getIncludeAutomaton)
                .collect(Collectors.toList());
            return new FieldPermissions(key, Automatons.unionAndMinimize(automatonList));
        });
    } catch (ExecutionException e) {
        throw new ElasticsearchException("unable to compute field permissions", e);
    }
});
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.TooComplexToDeterminizeException;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.cluster.metadata.AliasOrIndex;
import org.elasticsearch.cluster.metadata.IndexMetaData;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.Iterator;
import java.util.List;
import java.util.Map;
import java.util.Objects;

```

```

import java.util.Set;
import java.util.SortedMap;
import java.util.concurrent.ConcurrentHashMap;
import java.util.function.Function;
import java.util.function.Predicate;

import static java.util.Collections.unmodifiableMap;
import static java.util.Collections.unmodifiableSet;

/**
 * A permission that is based on privileges for index related actions executed
 * on specific indices
 */
public final class IndicesPermission implements Iterable<IndicesPermission.Group> {

    public static final IndicesPermission NONE = new IndicesPermission();

    private final Function<String, Predicate<String>> loadingFunction;

    private final ConcurrentHashMap<String, Predicate<String>> allowedIndicesMatchersForAction = new
    ConcurrentHashMap<>();

    private final Group[] groups;

    public IndicesPermission(Group... groups) {
        this.groups = groups;
        loadingFunction = (action) -> {
            List<String> indices = new ArrayList<>();
            for (Group group : groups) {
                if (group.actionMatcher.test(action)) {
                    indices.addAll(Arrays.asList(group.indices));
                }
            }
            return indexMatcher(indices);
        };
    }

    static Predicate<String> indexMatcher(List<String> indices) {
        try {
            return Automaton.predicate(indices);
        } catch (TooComplexToDeterminizeException e) {
            Loggers.getLogger(IndicesPermission.class).debug("Index pattern automaton [{}] is too complex", indices);
            String description = Strings.collectionToCommaDelimitedString(indices);
            if (description.length() > 80) {
                description = Strings.cleanTruncate(description, 80) + "...";
            }
            throw new ElasticsearchSecurityException("The set of permitted index patterns [{}] is too complex to
            evaluate", e, description);
        }
    }
}

```

```

    }
}

@Override
public Iterator<Group> iterator() {
    return Arrays.asList(groups).iterator();
}

public Group[] groups() {
    return groups;
}

/**
 * @return A predicate that will match all the indices that this permission
 * has the privilege for executing the given action on.
 */
public Predicate<String> allowedIndicesMatcher(String action) {
    return allowedIndicesMatchersForAction.computeIfAbsent(action, loadingFunction);
}

/**
 * Checks if the permission matches the provided action, without looking at indices.
 * To be used in very specific cases where indices actions need to be authorized regardless of their indices.
 * The usecase for this is composite actions that are initially only authorized based on the action name (indices are
not
 * checked on the coordinating node), and properly authorized later at the shard level checking their indices as
well.
 */
public boolean check(String action) {
    for (Group group : groups) {
        if (group.check(action)) {
            return true;
        }
    }
    return false;
}

public Automaton allowedActionsMatcher(String index) {
    List<Automaton> automatonList = new ArrayList<>();
    for (Group group : groups) {
        if (group.indexNameMatcher.test(index)) {
            automatonList.add(group.privilege.getAutomaton());
        }
    }
    return automatonList.isEmpty() ? Automaton.EMPTY : Automaton.unionAndMinimize(automatonList);
}

/**

```

```

* Authorizes the provided action against the provided indices, given the current cluster metadata
*/
public Map<String, IndicesAccessControl.IndexAccessControl> authorize(String action, Set<String>
requestedIndicesOrAliases,
                                Metadata metaData, FieldPermissionsCache fieldPermissionsCache) {
    // now... every index that is associated with the request, must be granted
    // by at least one indices permission group

    SortedMap<String, AliasOrIndex> allAliasesAndIndices = metaData.getAliasAndIndexLookup();
    Map<String, Set<FieldPermissions>> fieldPermissionsByIndex = new HashMap<>();
    Map<String, DocumentLevelPermissions> roleQueriesByIndex = new HashMap<>();
    Map<String, Boolean> grantedBuilder = new HashMap<>();

    for (String indexOrAlias : requestedIndicesOrAliases) {
        boolean granted = false;
        Set<String> concreteIndices = new HashSet<>();
        AliasOrIndex aliasOrIndex = allAliasesAndIndices.get(indexOrAlias);
        if (aliasOrIndex != null) {
            for (IndexMetaData indexMetaData : aliasOrIndex.getIndices()) {
                concreteIndices.add(indexMetaData.getIndex().getName());
            }
        }

        for (Group group : groups) {
            if (group.check(action, indexOrAlias)) {
                granted = true;
                for (String index : concreteIndices) {
                    Set<FieldPermissions> fieldPermissions = fieldPermissionsByIndex.computeIfAbsent(index, (k) ->
new HashSet<>());
                    fieldPermissionsByIndex.put(indexOrAlias, fieldPermissions);
                    fieldPermissions.add(group.getFieldPermissions());
                    DocumentLevelPermissions permissions =
                        roleQueriesByIndex.computeIfAbsent(index, (k) -> new DocumentLevelPermissions());
                    roleQueriesByIndex.putIfAbsent(indexOrAlias, permissions);
                    if (group.hasQuery()) {
                        permissions.addAll(group.getQuery());
                    } else {
                        // if more than one permission matches for a concrete index here and if
                        // a single permission doesn't have a role query then DLS will not be
                        // applied even when other permissions do have a role query
                        permissions.setAllowAll(true);
                    }
                }
            }
        }
    }

    if (concreteIndices.isEmpty()) {
        grantedBuilder.put(indexOrAlias, granted);
    }
}

```

```

    } else {
        grantedBuilder.put(indexOrAlias, granted);
        for (String concreteIndex : concreteIndices) {
            grantedBuilder.put(concreteIndex, granted);
        }
    }
}

Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = new HashMap<>();
for (Map.Entry<String, Boolean> entry : grantedBuilder.entrySet()) {
    String index = entry.getKey();
    DocumentLevelPermissions permissions = roleQueriesByIndex.get(index);
    final Set<BytesReference> roleQueries;
    if (permissions != null && permissions.isAllowAll() == false) {
        roleQueries = unmodifiableSet(permissions.queries);
    } else {
        roleQueries = null;
    }

    final FieldPermissions fieldPermissions;
    final Set<FieldPermissions> indexFieldPermissions = fieldPermissionsByIndex.get(index);
    if (indexFieldPermissions != null && indexFieldPermissions.isEmpty() == false) {
        fieldPermissions = indexFieldPermissions.size() == 1 ? indexFieldPermissions.iterator().next() :
            fieldPermissionsCache.getFieldPermissions(indexFieldPermissions);
    } else {
        fieldPermissions = FieldPermissions.DEFAULT;
    }
    indexPermissions.put(index, new IndicesAccessControl.IndexAccessControl(entry.getValue(),
fieldPermissions, roleQueries));
}
return unmodifiableMap(indexPermissions);
}

public static class Group {
    private final IndexPrivilege privilege;
    private final Predicate<String> actionMatcher;
    private final String[] indices;
    private final Predicate<String> indexNameMatcher;

    public FieldPermissions getFieldPermissions() {
        return fieldPermissions;
    }

    private final FieldPermissions fieldPermissions;
    private final Set<BytesReference> query;

    public Group(IndexPrivilege privilege, FieldPermissions fieldPermissions, @Nullable Set<BytesReference>
query, String... indices) {

```



```

    assert indices.length != 0;
    this.privilege = privilege;
    this.actionMatcher = privilege.predicate();
    this.indices = indices;
    this.indexNameMatcher = indexMatcher(Arrays.asList(indices));
    this.fieldPermissions = Objects.requireNonNull(fieldPermissions);
    this.query = query;
}

public IndexPrivilege privilege() {
    return privilege;
}

public String[] indices() {
    return indices;
}

@Nullable
public Set<BytesReference> getQuery() {
    return query;
}

private boolean check(String action) {
    return actionMatcher.test(action);
}

private boolean check(String action, String index) {
    assert index != null;
    return check(action) && indexNameMatcher.test(index);
}

boolean hasQuery() {
    return query != null;
}
}

private static class DocumentLevelPermissions {

    private Set<BytesReference> queries = null;
    private boolean allowAll = false;

    private void addAll(Set<BytesReference> query) {
        if (allowAll == false) {
            if (queries == null) {
                queries = new HashSet<>();
            }
            queries.addAll(query);
        }
    }
}

```

```

    }

    private boolean isAllowAll() {
        return allowAll;
    }

    private void setAllowAll(boolean allowAll) {
        this.allowAll = allowAll;
    }
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.index.DirectoryReader;
import org.apache.lucene.util.Accountable;
import org.apache.lucene.util.RamUsageEstimator;
import org.apache.lucene.util.automaton.Automata;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.CharacterRunAutomaton;
import org.apache.lucene.util.automaton.MinimizationOperations;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.regex.Regex;
import org.elasticsearch.index.mapper.AllFieldMapper;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.FieldSubsetReader;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;

import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.

```

- * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine whether or
- * not a field is granted access to:
- * 1. It has to match the patterns in grantedFieldsArray
- * 2. it must not match the patterns in deniedFieldsArray
- */

```
public final class FieldPermissions implements Accountable {

    public static final FieldPermissions DEFAULT = new FieldPermissions();

    private static final long BASE_FIELD_PERM_DEF_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldPermissionsDefinition(null, null));
    private static final long BASE_FIELD_GROUP_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldGrantExcludeGroup(null, null));
    private static final long BASE_HASHSET_SIZE = RamUsageEstimator.shallowSizeOfInstance(HashSet.class);
    private static final long BASE_HASHSET_ENTRY_SIZE;
    static {
        HashMap<String, Object> map = new HashMap<>();
        map.put(FieldPermissions.class.getName(), new Object());
        long mapEntryShallowSize = RamUsageEstimator.shallowSizeOf(map.entrySet().iterator().next());
        // assume a load factor of 50%
        // for each entry, we need two object refs, one for the entry itself
        // and one for the free space that is due to the fact hash tables can
        // not be fully loaded
        BASE_HASHSET_ENTRY_SIZE = mapEntryShallowSize + 2 *
RamUsageEstimator.NUM_BYTES_OBJECT_REF;
    }

    private final FieldPermissionsDefinition fieldPermissionsDefinition;
    // an automaton that represents a union of one more sets of permitted and denied fields
    private final CharacterRunAutomaton permittedFieldsAutomaton;
    private final boolean permittedFieldsAutomatonIsTotal;
    private final Automaton originalAutomaton;

    private final long ramBytesUsed;

    /** Constructor that does not enable field-level security: all fields are accepted. */
    public FieldPermissions() {
        this(new FieldPermissionsDefinition(null, null), Automatons.MATCH_ALL);
    }

    /** Constructor that enables field-level security based on include/exclude rules. Exclude rules
    * have precedence over include rules. */
    public FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
        this(fieldPermissionsDefinition, initializePermittedFieldsAutomaton(fieldPermissionsDefinition));
    }

    /** Constructor that enables field-level security based on include/exclude rules. Exclude rules
```

```

* have precedence over include rules. */
FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition, Automaton permittedFieldsAutomaton)
{
    if (permittedFieldsAutomaton.isDeterministic() == false && permittedFieldsAutomaton.getNumStates() > 1) {
        // we only accept deterministic automata so that the CharacterRunAutomaton constructor
        // directly wraps the provided automaton
        throw new IllegalArgumentException("Only accepts deterministic automata");
    }
    this.fieldPermissionsDefinition = fieldPermissionsDefinition;
    this.originalAutomaton = permittedFieldsAutomaton;
    this.permittedFieldsAutomaton = new CharacterRunAutomaton(permittedFieldsAutomaton);
    // we cache the result of isTotal since this might be a costly operation
    this.permittedFieldsAutomatonIsTotal = Operations.isTotal(permittedFieldsAutomaton);

    long ramBytesUsed = BASE_FIELD_PERM_DEF_BYTES;

    for (FieldGrantExcludeGroup group : fieldPermissionsDefinition.getFieldGrantExcludeGroups()) {
        ramBytesUsed += BASE_FIELD_GROUP_BYTES + BASE_HASHSET_ENTRY_SIZE;
        if (group.getGrantedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getGrantedFields());
        }
        if (group.getExcludedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getExcludedFields());
        }
    }
    ramBytesUsed += permittedFieldsAutomaton.ramBytesUsed();
    ramBytesUsed += runAutomatonRamBytesUsed(permittedFieldsAutomaton);
    this.ramBytesUsed = ramBytesUsed;
}

/**
 * Return an estimation of the ram bytes used by a { @link CharacterRunAutomaton }
 * that wraps the given automaton.
 */
private static long runAutomatonRamBytesUsed(Automaton a) {
    return a.getNumStates() * 5; // wild guess, better than 0
}

public static Automaton initializePermittedFieldsAutomaton(FieldPermissionsDefinition
fieldPermissionsDefinition) {
    Set<FieldGrantExcludeGroup> groups = fieldPermissionsDefinition.getFieldGrantExcludeGroups();
    assert groups.size() > 0 : "there must always be a single group for field inclusion/exclusion";
    List<Automaton> automatonList =
        groups.stream()
            .map(g -> FieldPermissions.initializePermittedFieldsAutomaton(g.getGrantedFields(),
g.getExcludedFields()))
            .collect(Collectors.toList());
    return Automatons.unionAndMinimize(automatonList);
}

```

```

}

private static Automaton initializePermittedFieldsAutomaton(final String[] grantedFields, final String[]
deniedFields) {
    Automaton grantedFieldsAutomaton;
    if (grantedFields == null || Arrays.stream(grantedFields).anyMatch(Regex::isMatchAllPattern)) {
        grantedFieldsAutomaton = Automaton.MATCH_ALL;
    } else {
        // an automaton that includes metadata fields, including join fields created by the _parent field such
        // as _parent#type
        Automaton metaFieldsAutomaton = Operations.concatenate(Automata.makeChar('_'),
Automata.makeAnyString());
        grantedFieldsAutomaton = Operations.union(Automaton.patterns(grantedFields), metaFieldsAutomaton);
    }

    Automaton deniedFieldsAutomaton;
    if (deniedFields == null || deniedFields.length == 0) {
        deniedFieldsAutomaton = Automaton.EMPTY;
    } else {
        deniedFieldsAutomaton = Automaton.patterns(deniedFields);
    }

    grantedFieldsAutomaton = MinimizationOperations.minimize(grantedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);
    deniedFieldsAutomaton = MinimizationOperations.minimize(deniedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);

    if (subsetOf(deniedFieldsAutomaton, grantedFieldsAutomaton) == false) {
        throw new ElasticsearchSecurityException("Exceptions for field permissions must be a subset of the " +
            "granted fields but " + Strings.arrayToCommaDelimitedString(deniedFields) + " is not a subset of " +
            Strings.arrayToCommaDelimitedString(grantedFields));
    }

    if (!containsAllField(grantedFields) && !containsAllField(deniedFields)) {
        // It is not explicitly stated whether _all should be allowed/denied
        // In that case we automatically disable _all, unless all fields would match
        if (Operations.isTotal(grantedFieldsAutomaton) && Operations.isEmpty(deniedFieldsAutomaton)) {
            // all fields are accepted, so using _all is fine
        } else {
            deniedFieldsAutomaton = Operations.union(deniedFieldsAutomaton,
Automata.makeString(AllFieldMapper.NAME));
        }
    }

    grantedFieldsAutomaton = Automaton.minusAndMinimize(grantedFieldsAutomaton,
deniedFieldsAutomaton);
    return grantedFieldsAutomaton;
}

```

```

private static boolean containsAllField(String[] fields) {
    return fields != null && Arrays.stream(fields).anyMatch(AllFieldMapper.NAME::equals);
}

/**
 * Returns true if this field permission policy allows access to the field and false if not.
 * fieldName can be a wildcard.
 */
public boolean grantsAccessTo(String fieldName) {
    return permittedFieldsAutomatonIsTotal || permittedFieldsAutomaton.run(fieldName);
}

FieldPermissionsDefinition getFieldPermissionsDefinition() {
    return fieldPermissionsDefinition;
}

/** Return whether field-level security is enabled, ie. whether any field might be filtered out. */
public boolean hasFieldLevelSecurity() {
    return permittedFieldsAutomatonIsTotal == false;
}

/** Return a wrapped reader that only exposes allowed fields. */
public DirectoryReader filter(DirectoryReader reader) throws IOException {
    if (hasFieldLevelSecurity() == false) {
        return reader;
    }
    return FieldSubsetReader.wrap(reader, permittedFieldsAutomaton);
}

// for testing only
Automaton getIncludeAutomaton() {
    return originalAutomaton;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    FieldPermissions that = (FieldPermissions) o;

    if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
    return fieldPermissionsDefinition != null ?
        fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
null;
}

```

```

@Override
public int hashCode() {
    int result = fieldPermissionsDefinition != null ? fieldPermissionsDefinition.hashCode() : 0;
    result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
    return result;
}

@Override
public long ramBytesUsed() {
    return ramBytesUsed;
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;

import java.util.function.Predicate;

/**
 * A permission that is based on privileges for cluster wide actions
 */
public final class ClusterPermission {

    public static final ClusterPermission NONE = new ClusterPermission(ClusterPrivilege.NONE);

    private final ClusterPrivilege privilege;
    private final Predicate<String> predicate;

    ClusterPermission(ClusterPrivilege privilege) {
        this.privilege = privilege;
        this.predicate = privilege.predicate();
    }

    public ClusterPrivilege privilege() {
        return privilege;
    }

    public boolean check(String action) {
        return predicate.test(action);
    }
}
/*
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```

```

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* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.xpack.core.security.authz.permission;

import java.util.Arrays;
import java.util.Collections;
import java.util.Set;

/**
 * Represents the definition of a {@link FieldPermissions}. Field permissions are defined as a
 * collections of grant and exclude definitions where the exclude definition must be a subset of
 * the grant definition.
 */
public final class FieldPermissionsDefinition {

    private final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups;

    public FieldPermissionsDefinition(String[] grant, String[] exclude) {
        this(Collections.singleton(new FieldGrantExcludeGroup(grant, exclude)));
    }

    public FieldPermissionsDefinition(Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups) {
        this.fieldGrantExcludeGroups = Collections.unmodifiableSet(fieldGrantExcludeGroups);
    }

    public Set<FieldGrantExcludeGroup> getFieldGrantExcludeGroups() {
        return fieldGrantExcludeGroups;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;

        FieldPermissionsDefinition that = (FieldPermissionsDefinition) o;

        return fieldGrantExcludeGroups != null ?
            fieldGrantExcludeGroups.equals(that.fieldGrantExcludeGroups) :
            that.fieldGrantExcludeGroups == null;
    }

    @Override
    public int hashCode() {
        return fieldGrantExcludeGroups != null ? fieldGrantExcludeGroups.hashCode() : 0;
    }

    public static final class FieldGrantExcludeGroup {

```



```

private final String[] grantedFields;
private final String[] excludedFields;

public FieldGrantExcludeGroup(String[] grantedFields, String[] excludedFields) {
    this.grantedFields = grantedFields;
    this.excludedFields = excludedFields;
}

public String[] getGrantedFields() {
    return grantedFields;
}

public String[] getExcludedFields() {
    return excludedFields;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    FieldGrantExcludeGroup that = (FieldGrantExcludeGroup) o;

    if (!Arrays.equals(grantedFields, that.grantedFields)) return false;
    return Arrays.equals(excludedFields, that.excludedFields);
}

@Override
public int hashCode() {
    int result = Arrays.hashCode(grantedFields);
    result = 31 * result + Arrays.hashCode(excludedFields);
    return result;
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseAction extends Action<GetLicenseRequest, GetLicenseResponse,
GetLicenseRequestBuilder> {

```

```

public static final GetLicenseAction INSTANCE = new GetLicenseAction();
public static final String NAME = "cluster:monitor/xpack/license/get";

private GetLicenseAction() {
    super(NAME);
}

@Override
public GetLicenseResponse newResponse() {
    return new GetLicenseResponse();
}

@Override
public GetLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new GetLicenseRequestBuilder(client, this);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.AbstractNamedDiffable;
import org.elasticsearch.cluster.MergableCustomMetaData;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.io.IOException;
import java.util.EnumSet;

/**
 * Contains metadata about registered licenses
 */
public class LicensesMetaData extends AbstractNamedDiffable<MetaData.Custom> implements
XPackPlugin.XPackMetaDataCustom,
    MergableCustomMetaData<LicensesMetaData> {

    public static final String TYPE = "licenses";

```

```

/**
 * When license is explicitly removed by a user, LICENSE_TOMBSTONE
 * is used as a placeholder in the license metadata. This enables
 * us to distinguish between the scenario when a cluster never
 * had a license (null) and when a license was removed explicitly
 * (LICENSE_TOMBSTONE).
 * We rely on this to decide whether to generate a unsigned trial
 * license or not. we should only generate a license if no license
 * ever existed in the cluster state
 */
public static final License LICENSE_TOMBSTONE = License.builder()
    .type("trial")
    .issuer("elasticsearch")
    .uid("TOMBSTONE")
    .issuedTo("")
    .maxNodes(0)
    .issueDate(0)
    .expiryDate(0)
    .build();

private License license;

// This field describes the version of x-pack for which this cluster has exercised a trial. If the field
// is null, then no trial has been exercised. We keep the version to leave open the possibility that we
// may eventually allow a cluster to exercise a trial every time they upgrade to a new major version.
@Nullable
private Version trialVersion;

LicensesMetaData(License license, Version trialVersion) {
    this.license = license;
    this.trialVersion = trialVersion;
}

public License getLicense() {
    return license;
}

boolean isEligibleForTrial() {
    if (trialVersion == null) {
        return true;
    }
    return Version.CURRENT.major > trialVersion.major;
}

Version getMostRecentTrialVersion() {
    return trialVersion;
}

```

```

@Override
public String toString() {
    return "LicensesMetaData{" +
        "license=" + license +
        ", trialVersion=" + trialVersion +
        '}';
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    LicensesMetaData that = (LicensesMetaData) o;

    if (license != null ? !license.equals(that.license) : that.license != null) return false;
    return trialVersion != null ? trialVersion.equals(that.trialVersion) : that.trialVersion == null;
}

@Override
public int hashCode() {
    int result = license != null ? license.hashCode() : 0;
    result = 31 * result + (trialVersion != null ? trialVersion.hashCode() : 0);
    return result;
}

@Override
public String getWriteableName() {
    return TYPE;
}

@Override
public Version getMinimalSupportedVersion() {
    return Version.CURRENT.minimumCompatibilityVersion();
}

@Override
public EnumSet<MetaData.XContentContext> context() {
    return EnumSet.of(MetaData.XContentContext.GATEWAY);
}

public static LicensesMetaData fromXContent(XContentParser parser) throws IOException {
    License license = LICENSE_TOMBSTONE;
    Version trialLicense = null;
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {

```

```

String fieldName = parser.currentName();
if (fieldName != null) {
    if (fieldName.equals(Fields.LICENSE)) {
        token = parser.nextToken();
        if (token == XContentParser.Token.START_OBJECT) {
            license = License.fromXContent(parser);
        } else if (token == XContentParser.Token.VALUE_NULL) {
            license = LICENSE_TOMBSTONE;
        }
    } else if (fieldName.equals(Fields.TRIAL_LICENSE)) {
        parser.nextToken();
        trialLicense = Version.fromString(parser.text());
    }
}
}
return new LicensesMetaData(license, trialLicense);
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        builder.nullField(Fields.LICENSE);
    } else {
        builder.startObject(Fields.LICENSE);
        license.toInnerXContent(builder, params);
        builder.endObject();
    }
    if (trialVersion != null) {
        builder.field(Fields.TRIAL_LICENSE, trialVersion.toString());
    }
    return builder;
}

@Override
public void writeTo(StreamOutput streamOutput) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        streamOutput.writeBoolean(false); // no license
    } else {
        streamOutput.writeBoolean(true); // has a license
        license.writeTo(streamOutput);
    }
    if (streamOutput.getVersion().onOrAfter(Version.V_6_1_0)) {
        if (trialVersion == null) {
            streamOutput.writeBoolean(false);
        } else {
            streamOutput.writeBoolean(true);
            Version.writeVersion(trialVersion, streamOutput);
        }
    }
}

```

```

    }
}

public LicensesMetaData(StreamInput streamInput) throws IOException {
    if (streamInput.readBoolean()) {
        license = License.readLicense(streamInput);
    } else {
        license = LICENSE_TOMBSTONE;
    }
    if (streamInput.getVersion().onOrAfter(Version.V_6_1_0)) {
        boolean hasExercisedTrial = streamInput.readBoolean();
        if (hasExercisedTrial) {
            this.trialVersion = Version.readVersion(streamInput);
        }
    }
}

public static NamedDiff<MetaData.Custom> readDiffFrom(StreamInput streamInput) throws IOException {
    return readDiffFrom(MetaData.Custom.class, TYPE, streamInput);
}

public static License extractLicense(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        License license = licensesMetaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return null;
        } else {
            return license;
        }
    }
    return null;
}

@Override
public LicensesMetaData merge(LicensesMetaData other) {
    if (other.license == null) {
        return this;
    } else if (license == null
        || OperationMode.compare(other.license.operationMode(), license.operationMode()) > 0) {
        return other;
    }
    return this;
}

private static final class Fields {
    private static final String LICENSE = "license";
    private static final String TRIAL_LICENSE = "trial_license";
}

```

```

    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(DELETE, URI_BASE + "/license", this,
            DELETE, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(DELETE, "/_licenses", this,
            "[DELETE /_licenses] is deprecated! Use " +
            "[DELETE /_xpack/license] instead.",
            deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_delete_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        DeleteLicenseRequest deleteLicenseRequest = new DeleteLicenseRequest();
        deleteLicenseRequest.timeout(request.paramAsTime("timeout", deleteLicenseRequest.timeout()));
        deleteLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
        deleteLicenseRequest.masterNodeTimeout()));

        return channel -> client.es().admin().cluster().execute(DeleteLicenseAction.INSTANCE, deleteLicenseRequest,

```

```

        new RestToXContentListener<>(channel));
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
PutLicenseRequestBuilder> {

    public static final PutLicenseAction INSTANCE = new PutLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/put";

    private PutLicenseAction() {
        super(NAME);
    }

    @Override
    public PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    public PutLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PutLicenseRequestBuilder(client, this);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetBasicStatusRequest extends MasterNodeReadRequest<GetBasicStatusRequest> {

```



```

public GetBasicStatusRequest() {
}

@Override
public ActionRequestValidationException validate() {
    return null;
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetTrialStatusAction extends Action<GetTrialStatusRequest, GetTrialStatusResponse,
GetTrialStatusRequestBuilder> {

    public static final GetTrialStatusAction INSTANCE = new GetTrialStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/trial_status";

    private GetTrialStatusAction() {
        super(NAME);
    }

    @Override
    public GetTrialStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetTrialStatusRequestBuilder(client, this);
    }

    @Override
    public GetTrialStatusResponse newResponse() {
        return new GetTrialStatusResponse();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;

```

```

import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetBasicStatusAction extends TransportMasterNodeReadAction<GetBasicStatusRequest,
GetBasicStatusResponse> {

    @Inject
    public TransportGetBasicStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,

        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetBasicStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, GetBasicStatusRequest::new);
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected GetBasicStatusResponse newResponse() {
        return new GetBasicStatusResponse();
    }

    @Override
    protected void masterOperation(GetBasicStatusRequest request, ClusterState state,
        ActionListener<GetBasicStatusResponse> listener) throws Exception {
        LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
        if (licensesMetaData == null) {
            listener.onResponse(new GetBasicStatusResponse(true));
        } else {
            License license = licensesMetaData.getLicense();
            listener.onResponse(new GetBasicStatusResponse(license == null || license.type().equals("basic") == false));
        }
    }

    @Override
    protected ClusterBlockException checkBlock(GetBasicStatusRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
    }
}

```

```

    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartBasicAction extends TransportMasterNodeAction<PostStartBasicRequest,
PostStartBasicResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartBasicAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartBasicAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, PostStartBasicRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }

    @Override

```

```

protected void masterOperation(PostStartBasicRequest request, ClusterState state,
    ActionListener<PostStartBasicResponse> listener) throws Exception {
    licenseService.startBasicLicense(request, listener);
}

@Override
protected ClusterBlockException checkBlock(PostStartBasicRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetTrialStatus extends XPackRestHandler {

    RestGetTrialStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/trial_status", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        return channel -> client.licensing().prepareGetStartTrial().execute(
            new RestBuilderListener<GetTrialStatusResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetTrialStatusResponse response, XContentBuilder builder) throws
                Exception {
                    builder.startObject();

```

```

        builder.field("eligible_to_start_trial", response.isEligibleToStartTrial());
        builder.endObject();
        return new BytesRestResponse(RestStatus.OK, builder);
    }
});
}

@Override
public String getName() {
    return "xpack_trial_status_action";
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseAction extends Action<DeleteLicenseRequest, DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

    public static final DeleteLicenseAction INSTANCE = new DeleteLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/delete";

    private DeleteLicenseAction() {
        super(NAME);
    }

    @Override
    public DeleteLicenseResponse newResponse() {
        return new DeleteLicenseResponse();
    }

    @Override
    public DeleteLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new DeleteLicenseRequestBuilder(client, this);
    }
}
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetTrialStatusRequest extends MasterNodeReadRequest<GetTrialStatusRequest> {

    public GetTrialStatusRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
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 */
package org.elasticsearch.license;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.core.internal.io.Streams;

import java.io.ByteArrayOutputStream;
import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Arrays;
import java.util.Base64;
import java.util.Collections;

/**
 * Responsible for verifying signed licenses
 */

```

```

public class LicenseVerifier {

    /**
     * verifies the license content with the signature using the packaged
     * public key
     * @param license to verify
     * @return true if valid, false otherwise
     */
    public static boolean verifyLicense(final License license, byte[] encryptedPublicKeyData) {
        byte[] signedContent = null;
        byte[] signatureHash = null;
        try {
            byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
            ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
            int version = byteBuffer.getInt();
            int magicLen = byteBuffer.getInt();
            byte[] magic = new byte[magicLen];
            byteBuffer.get(magic);
            int hashLen = byteBuffer.getInt();
            signatureHash = new byte[hashLen];
            byteBuffer.get(signatureHash);
            int signedContentLen = byteBuffer.getInt();
            signedContent = new byte[signedContentLen];
            byteBuffer.get(signedContent);
            XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
            license.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
            Signature rsa = Signature.getInstance("SHA512withRSA");
            rsa.initVerify(CryptUtils.readEncryptedPublicKey(encryptedPublicKeyData));
            BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
            BytesRef ref;
            while((ref = iterator.next()) != null) {
                rsa.update(ref.bytes, ref.offset, ref.length);
            }
            return rsa.verify(signedContent)
                && Arrays.equals(Base64.getEncoder().encode(encryptedPublicKeyData), signatureHash);
        } catch (IOException | NoSuchAlgorithmException | SignatureException | InvalidKeyException e) {
            throw new IllegalStateException(e);
        } finally {
            Arrays.fill(encryptedPublicKeyData, (byte) 0);
            if (signedContent != null) {
                Arrays.fill(signedContent, (byte) 0);
            }
            if (signatureHash != null) {
                Arrays.fill(signatureHash, (byte) 0);
            }
        }
    }
}

```

```

public static boolean verifyLicense(final License license) {
    final byte[] publicKeyBytes;
    try (InputStream is = LicenseVerifier.class.getResourceAsStream("/public.key")) {
        ByteArrayOutputStream out = new ByteArrayOutputStream();
        Streams.copy(is, out);
        publicKeyBytes = out.toByteArray();
    } catch (IOException ex) {
        throw new IllegalStateException(ex);
    }
    return verifyLicense(license, publicKeyBytes);
}
}
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicReference;

public class StartBasicClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
    To acknowledge the license, " +
        "please read the following messages and call /start_basic again, this time with the \"acknowledge=true\"
    parameter.";

    private final Logger logger;
    private final String clusterName;
    private final PostStartBasicRequest request;
    private final ActionListener<PostStartBasicResponse> listener;
    private final Clock clock;

```



```

private AtomicReference<Map<String, String[]>> ackMessages = new
AtomicReference<>(Collections.emptyMap());

StartBasicClusterTask(Logger logger, String clusterName, Clock clock, PostStartBasicRequest request,
    ActionListener<PostStartBasicResponse> listener) {
    this.logger = logger;
    this.clusterName = clusterName;
    this.request = request;
    this.listener = listener;
    this.clock = clock;
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
    logger.debug("license prior to starting basic license: {}", oldLicensesMetaData);
    License oldLicense = LicensesMetaData.extractLicense(oldLicensesMetaData);
    Map<String, String[]> acknowledgeMessages = ackMessages.get();
    if (acknowledgeMessages.isEmpty() == false) {
        listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT, acknowledgeMessages,
            ACKNOWLEDGEMENT_HEADER));
    } else if (oldLicense != null && oldLicense.type().equals("basic")) {
        listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.ALREADY_USING_BASIC));
    } else {
        listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.GENERATED_BASIC));
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData licensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
    License currentLicense = LicensesMetaData.extractLicense(licensesMetaData);
    if (currentLicense == null || currentLicense.type().equals("basic") == false) {
        long issueDate = clock.millis();
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type("basic")
            .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        if (request.isAcknowledged() == false && currentLicense != null) {
            Map<String, String[]> ackMessages = LicenseService.getAckMessages(selfGeneratedLicense,

```

```

currentLicense);
    if (ackMessages.isEmpty() == false) {
        this.ackMessages.set(ackMessages);
        return currentState;
    }
}
Version trialVersion = null;
if (licensesMetaData != null) {
    trialVersion = licensesMetaData.getMostRecentTrialVersion();
}
LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense, trialVersion);
mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
return ClusterState.builder(currentState).metaData(mdBuilder).build();
} else {
    return currentState;
}
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
    listener.onFailure(e);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.monitoring.MonitoringField;

import java.util.Collections;
import java.util.LinkedHashMap;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.concurrent.CopyOnWriteArrayList;

```

```

import java.util.function.BiFunction;

/**
 * A holder for the current state of the license for all xpack features.
 */
public class XPackLicenseState {

    /** Messages for each feature which are printed when the license expires. */
    static final Map<String, String[]> EXPIRATION_MESSAGES;
    static {
        Map<String, String[]> messages = new LinkedHashMap<>();
        messages.put(XPackField.SECURITY, new String[] {
            "Cluster health, cluster stats and indices stats operations are blocked",
            "All data operations (read and write) continue to work"
        });
        messages.put(XPackField.WATCHER, new String[] {
            "PUT / GET watch APIs are disabled, DELETE watch API continues to work",
            "Watches execute and write to the history",
            "The actions of the watches don't execute"
        });
        messages.put(XPackField.MONITORING, new String[] {
            "The agent will stop collecting cluster and indices metrics",
            "The agent will stop automatically cleaning indices older than [xpack.monitoring.history.duration]"
        });
        messages.put(XPackField.GRAPH, new String[] {
            "Graph explore APIs are disabled"
        });
        messages.put(XPackField.MACHINE_LEARNING, new String[] {
            "Machine learning APIs are disabled"
        });
        messages.put(XPackField.LOGSTASH, new String[] {
            "Logstash will continue to poll centrally-managed pipelines"
        });
        messages.put(XPackField.DEPRECATATION, new String[] {
            "Deprecation APIs are disabled"
        });
        messages.put(XPackField.UPGRADE, new String[] {
            "Upgrade API is disabled"
        });
        messages.put(XPackField.SQL, new String[] {
            "SQL support is disabled"
        });
        messages.put(XPackField.ROLLUP, new String[] {
            "Creating and Starting rollup jobs will no longer be allowed.",
            "Stopping/Deleting existing jobs, RollupCaps API and RollupSearch continue to function."
        });
        EXPIRATION_MESSAGES = Collections.unmodifiableMap(messages);
    }
}

```

```

/**
 * Messages for each feature which are printed when the license type changes.
 * The value is a function taking the old and new license type, and returns the messages for that feature.
 */
static final Map<String, BiFunction<OperationMode, OperationMode, String[]>>
ACKNOWLEDGMENT_MESSAGES;
static {
    Map<String, BiFunction<OperationMode, OperationMode, String[]>> messages = new LinkedHashMap<>();
    messages.put(XPackField.SECURITY, XPackLicenseState::securityAcknowledgementMessages);
    messages.put(XPackField.WATCHER, XPackLicenseState::watcherAcknowledgementMessages);
    messages.put(XPackField.MONITORING, XPackLicenseState::monitoringAcknowledgementMessages);
    messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
    messages.put(XPackField.MACHINE_LEARNING,
XPackLicenseState::machineLearningAcknowledgementMessages);
    messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgementMessages);
    messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
    ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}

private static String[] securityAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        "The following X-Pack security functionality will be disabled: authentication, authorization, " +
                            "ip filtering, and auditing. Please restart your node after applying the license.",
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
            break;
        case GOLD:
            switch (currentMode) {
                case BASIC:
                case STANDARD:
                    // ^^ though technically it was already disabled, it's not bad to remind them
                case TRIAL:
                case PLATINUM:
                    return new String[] {
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
    }
}

```

```

    }
    break;
case STANDARD:
    switch (currentMode) {
        case BASIC:
            // ^^ though technically it was already disabled, it's not bad to remind them
        case GOLD:
        case PLATINUM:
        case TRIAL:
            return new String[] {
                "Authentication will be limited to the native realms.",
                "IP filtering and auditing will be disabled.",
                "Field and document level access control will be disabled.",
                "Custom realms will be ignored."
            };
    }
}
return Strings.EMPTY_ARRAY;
}

```

```

private static String[] watcherAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] { "Watcher will be disabled" };
            }
        break;
    }
    return Strings.EMPTY_ARRAY;
}

```

```

private static String[] monitoringAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        LoggerMessageFormat.format(
                            "Multi-cluster support is disabled for clusters with [{}] license. If you are\n" +

```

```

        "running multiple clusters, users won't be able to access the clusters with\n" +
        "[{}] licenses from within a single X-Pack Kibana instance. You will have to deploy a\n" +
        "separate and dedicated X-pack Kibana instance for each [{}] cluster you wish to monitor.",
        newMode, newMode, newMode),
    LoggerMessageFormat.format(
        "Automatic index cleanup is locked to {} days for clusters with [{}] license.",
        MonitoringField.HISTORY_DURATION.getDefault(Settings.EMPTY).days(), newMode)
    };
    }
    break;
}
return Strings.EMPTY_ARRAY;
}

private static String[] graphAcknowledgementMessages(OperationMode currentMode, OperationMode newMode)
{
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Graph will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] machineLearningAcknowledgementMessages(OperationMode currentMode,
OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Machine learning will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] logstashAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {

```

```

switch (newMode) {
    case BASIC:
        switch (currentMode) {
            case TRIAL:
            case STANDARD:
            case GOLD:
            case PLATINUM:
                return new String[] { "Logstash will no longer poll for centrally-managed pipelines" };
            }
        break;
    }
return Strings.EMPTY_ARRAY;
}

private static String[] sqlAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "JDBC support will be disabled, but you can continue to use SQL CLI and
REST endpoint" };
                }
            break;
        }
        return Strings.EMPTY_ARRAY;
    }
}

/** A wrapper for the license mode and state, to allow atomically swapping. */
private static class Status {

    /** The current "mode" of the license (ie license type). */
    final OperationMode mode;

    /** True if the license is active, or false if it is expired. */
    final boolean active;

    Status(OperationMode mode, boolean active) {
        this.mode = mode;
        this.active = active;
    }
}

private volatile Status status = new Status(OperationMode.TRIAL, true);
private final List<Runnable> listeners = new CopyOnWriteArrayList<>();
private final boolean isSecurityEnabled;

```

```

private final boolean isSecurityExplicitlyEnabled;
private volatile boolean isSecurityEnabledByTrialVersion;

public XPackLicenseState(Settings settings) {
    this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
    // 6.0+ requires TLS for production licenses, so if TLS is enabled and security is enabled
    // we can interpret this as an explicit enabling of security if the security enabled
    // setting is not explicitly set
    this.isSecurityExplicitlyEnabled = isSecurityEnabled &&
        (settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) ||
XPackSettings.TRANSPORT_SSL_ENABLED.get(settings));
    this.isSecurityEnabledByTrialVersion = false;
}

/**
 * Updates the current state of the license, which will change what features are available.
 *
 * @param mode The mode (type) of the current license.
 * @param active True if the current license exists and is within its allowed usage period; false if it is expired or
missing.
 * @param mostRecentTrialVersion If this cluster has, at some point commenced a trial, the most recent version
on which they did that.
 *
 * May be { @code null } if they have never generated a trial license on this cluster, or the most
recent
 *
 * trial was prior to this metadata being tracked (6.1)
 */
void update(OperationMode mode, boolean active, @Nullable Version mostRecentTrialVersion) {
    status = new Status(mode, active);
    if (isSecurityEnabled == true && isSecurityExplicitlyEnabled == false && mode == OperationMode.TRIAL
&& isSecurityEnabledByTrialVersion == false) {
        // Before 6.3, Trial licenses would default having security enabled.
        // If this license was generated before that version, then treat it as if security is explicitly enabled
        if (mostRecentTrialVersion == null || mostRecentTrialVersion.before(Version.V_6_3_0)) {
            Loggers.getLogger(getClass()).info("Automatically enabling security for older trial license ({})",
                mostRecentTrialVersion == null ? "[pre 6.1.0]" : mostRecentTrialVersion.toString());
            isSecurityEnabledByTrialVersion = true;
        }
    }
    listeners.forEach(Runnable::run);
}

/** Add a listener to be notified on license change */
public void addListener(Runnable runnable) {
    listeners.add(Objects.requireNonNull(runnable));
}

/** Remove a listener */
public void removeListener(Runnable runnable) {

```



```

        listeners.remove(runnable);
    }

    /** Return the current license type. */
    public OperationMode getOperationMode() {
        return status.mode;
    }

    /** Return true if the license is currently within its time boundaries, false otherwise. */
    public boolean isActive() {
        return status.active;
    }

    /**
     * @return true if authentication and authorization should be enabled. this does not indicate what realms are
     available
     * @see #allowedRealmType() for the enabled realms
     */
    public boolean isAuthAllowed() {
        OperationMode mode = status.mode;
        return mode == OperationMode.STANDARD || mode == OperationMode.GOLD || mode ==
OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
    }

    /**
     * @return true if IP filtering should be enabled
     */
    public boolean isIpFilteringAllowed() {
        OperationMode mode = status.mode;
        return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
    }

    /**
     * @return true if auditing should be enabled
     */
    public boolean isAuditingAllowed() {
        OperationMode mode = status.mode;
        return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
    }

    /**
     * Indicates whether the stats and health API calls should be allowed. If a license is expired and past the grace
     * period then we deny these calls.
     *
     * @return true if the license allows for the stats and health APIs to be used.
     */

```

```

*/
public boolean isStatsAndHealthAllowed() {
    return status.active;
}

/**
 * Determine if Document Level Security (DLS) and Field Level Security (FLS) should be enabled.
 * <p>
 * DLS and FLS are only disabled when the mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 * Note: This does not consider the <em>state</em> of the license so that Security does not suddenly leak
information!
 *
 * @return {@code true} to enable DLS and FLS. Otherwise {@code false}.
 */
public boolean isDocumentAndFieldLevelSecurityAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL || mode == OperationMode.PLATINUM;
}

/** Classes of realms that may be available based on the license type. */
public enum AllowedRealmType {
    NONE,
    NATIVE,
    DEFAULT,
    ALL
}

/**
 * @return the type of realms that are enabled based on the license {@link OperationMode}
 */
public AllowedRealmType allowedRealmType() {
    switch (status.mode) {
        case PLATINUM:
        case TRIAL:
            return AllowedRealmType.ALL;
        case GOLD:
            return AllowedRealmType.DEFAULT;
        case STANDARD:
            return AllowedRealmType.NATIVE;
        default:
            return AllowedRealmType.NONE;
    }
}
}

```

```

/**
 * @return whether custom role providers are allowed based on the license { @link OperationMode}
 */
public boolean isCustomRoleProvidersAllowed() {
    final Status localStatus = status;
    return (localStatus.mode == OperationMode.PLATINUM || localStatus.mode == OperationMode.TRIAL )
        && localStatus.active;
}

/**
 * Determine if Watcher is available based on the current license.
 * <p>
 * Watcher is available if the license is active (hasn't expired) and of one of the following types:
 * <ul>
 * <li>{ @link OperationMode#STANDARD}</li>
 * <li>{ @link OperationMode#PLATINUM}</li>
 * <li>{ @link OperationMode#GOLD}</li>
 * <li>{ @link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return { @code true} as long as the license is valid. Otherwise { @code false}.
 */
public boolean isWatcherAllowed() {
    // status is volatile, so a local variable is used for a consistent view
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:
        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

/**
 * Monitoring is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isMonitoringAllowed() {
    return status.active;
}

```

```

}

/**
 * Monitoring Cluster Alerts requires the equivalent license to use Watcher.
 *
 * @return {@link #isWatcherAllowed()}
 * @see #isWatcherAllowed()
 */
public boolean isMonitoringClusterAlertsAllowed() {
    return isWatcherAllowed();
}

/**
 * Determine if the current license allows the retention of indices to be modified.
 * <p>
 * Only users with a non-{@link OperationMode#BASIC} license can update the retention period.
 * <p>
 * Note: This does not consider the <em>state</em> of the license so that any change is remembered for when
they fix their license.
 *
 * @return {@code true} if the user is allowed to modify the retention. Otherwise {@code false}.
 */
public boolean isUpdateRetentionAllowed() {
    final OperationMode mode = status.mode;
    return mode != OperationMode.BASIC && mode != OperationMode.MISSING;
}

/**
 * Determine if Graph Exploration should be enabled.
 * <p>
 * Exploration is only disabled when the license has expired or if the mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return {@code true} as long as the license is valid. Otherwise {@code false}.
 */
public boolean isGraphAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

```

```

/**
 * Determine if Machine Learning should be enabled.
 * <p>
 * Machine Learning is only disabled when the license has expired or if the
 * mode is not:
 * <ul>
 * <li>{ @link OperationMode#PLATINUM}</li>
 * <li>{ @link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return { @code true } as long as the license is valid. Otherwise
 *         { @code false }.
 */
public boolean isMachineLearningAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
 * Rollup is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isRollupAllowed() {
    return status.active;
}

/**
 * Logstash is allowed as long as there is an active license of type TRIAL, STANDARD, GOLD or PLATINUM
 * @return { @code true } as long as there is a valid license
 */
public boolean isLogstashAllowed() {
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:

```

```

        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

/**
 * Deprecation APIs are always allowed as long as there is an active license
 * @return {@code true} as long as there is a valid license
 */
public boolean isDeprecationAllowed() {
    return status.active;
}

/**
 * Determine if Upgrade API should be enabled.
 * <p>
 * Upgrade API is not available in for all license types except {@link OperationMode#MISSING}
 *
 * @return {@code true} as long as the license is valid. Otherwise
 *         {@code false}.
 */
public boolean isUpgradeAllowed() {
    // status is volatile
    Status localStatus = status;
    // Should work on all active licenses
    return localStatus.active;
}

/**
 * Determine if SQL support should be enabled.
 * <p>
 * SQL is available for all license types except {@link OperationMode#MISSING}
 */
public boolean isSqlAllowed() {
    return status.active;
}

/**
 * Determine if JDBC support should be enabled.
 * <p>
 * JDBC is available only in for {@link OperationMode#PLATINUM} and {@link OperationMode#TRIAL}
licences
 */
public boolean isJdbcAllowed() {
    // status is volatile

```

```

    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

public boolean isTrialLicense() {
    return status.mode == OperationMode.TRIAL;
}

public boolean isSecurityAvailable() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM || mode ==
OperationMode.STANDARD ||
        mode == OperationMode.TRIAL;
}

public boolean isSecurityEnabled() {
    final OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL ? (isSecurityExplicitlyEnabled || isSecurityEnabledByTrialVersion) :
isSecurityEnabled;
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseResponse extends AcknowledgedResponse {

    DeleteLicenseResponse() {
    }

    DeleteLicenseResponse(boolean acknowledged) {
        super(acknowledged);
    }
}

```

```

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
}

}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

public class PutLicenseResponse extends AcknowledgedResponse {

    private LicensesStatus status;
    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeHeader;

    PutLicenseResponse() {
    }

    public PutLicenseResponse(boolean acknowledged, LicensesStatus status) {
        this(acknowledged, status, null, Collections.<String, String[]>emptyMap());
    }

    public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String acknowledgeHeader,
        Map<String, String[]> acknowledgeMessages) {
        super(acknowledged);
        this.status = status;

```



```

    this.acknowledgeHeader = acknowledgeHeader;
    this.acknowledgeMessages = acknowledgeMessages;
}

public LicensesStatus status() {
    return status;
}

public Map<String, String[]> acknowledgeMessages() {
    return acknowledgeMessages;
}

public String acknowledgeHeader() {
    return acknowledgeHeader;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
    status = LicensesStatus.fromId(in.readVInt());
    acknowledgeHeader = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
    out.writeVInt(status.id());
    out.writeOptionalString(acknowledgeHeader);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}

```

```

    }
  }
}

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
  switch (status) {
    case VALID:
      builder.field("license_status", "valid");
      break;
    case INVALID:
      builder.field("license_status", "invalid");
      break;
    case EXPIRED:
      builder.field("license_status", "expired");
      break;
    default:
      throw new IllegalArgumentException("unknown status [" + status + "] found");
  }
  if (!acknowledgeMessages.isEmpty()) {
    builder.startObject("acknowledge");
    builder.field("message", acknowledgeHeader);
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
      builder.startArray(entry.getKey());
      for (String message : entry.getValue()) {
        builder.value(message);
      }
      builder.endArray();
    }
    builder.endObject();
  }
}

```

```

@Override
public String toString() {
  return Strings.toString(this, true, true);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

```

```

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
    PostStartTrialResponse, PostStartTrialRequestBuilder> {

    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportDeleteLicenseAction extends TransportMasterNodeAction<DeleteLicenseRequest,
    DeleteLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportDeleteLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, DeleteLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, DeleteLicenseRequest::new);
        this.licenseService = licenseService;
    }
}

```

```

@Override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@Override
protected DeleteLicenseResponse newResponse() {
    return new DeleteLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(DeleteLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final DeleteLicenseRequest request, ClusterState state, final
ActionListener<DeleteLicenseResponse>
    listener) throws ElasticsearchException {
    licenseService.removeLicense(request, new ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            listener.onResponse(new DeleteLicenseResponse(clusterStateUpdateResponse.isAcknowledged()));
        }
    });
}

@Override
public void onFailure(Exception e) {
    listener.onFailure(e);
}
});
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.apache.lucene.util.BytesRef;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.watcher.FileChangesListener;

```

```

import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.concurrent.atomic.AtomicBoolean;

/**
 * File based watcher for license {@link OperationMode}
 * Watches for changes in <code>licenseModePath</code>, use
 * {@link #getCurrentOperationMode()} to access the latest mode
 *
 * In case of failure to read a valid operation mode from <code>licenseModePath</code>,
 * the operation mode will default to PLATINUM
 */
public final class OperationModeFileWatcher implements FileChangesListener {
    private final ResourceWatcherService resourceWatcherService;
    private final Path licenseModePath;
    private final AtomicBoolean initialized = new AtomicBoolean();
    private final OperationMode defaultOperationMode = OperationMode.PLATINUM;
    private volatile OperationMode currentOperationMode = defaultOperationMode;
    private final Logger logger;
    private final Runnable onChange;

    public OperationModeFileWatcher(ResourceWatcherService resourceWatcherService, Path licenseModePath,
        Logger logger, Runnable onChange) {
        this.resourceWatcherService = resourceWatcherService;
        this.licenseModePath = licenseModePath;
        this.logger = logger;
        this.onChange = onChange;
    }

    public void init() {
        if (initialized.compareAndSet(false, true)) {
            final FileWatcher watcher = new FileWatcher(licenseModePath);
            watcher.addListener(this);
            try {
                resourceWatcherService.add(watcher, ResourceWatcherService.Frequency.HIGH);
                if (Files.exists(licenseModePath)) {
                    onChange(licenseModePath);
                }
            } catch (IOException e) {
                logger.error("couldn't initialize watching license mode file", e);
            }
        }
    }
}

```

```

/**
 * Returns the current operation mode based on license mode file.
 * Defaults to {@link OperationMode#PLATINUM}
 */
public OperationMode getCurrentOperationMode() {
    return currentOperationMode;
}

@Override
public void onFileInit(Path file) {
    onChange(file);
}

@Override
public void onFileCreated(Path file) {
    onChange(file);
}

@Override
public void onFileDeleted(Path file) {
    onChange(file);
}

@Override
public void onFileChanged(Path file) {
    onChange(file);
}

private synchronized void onChange(Path file) {
    if (file.equals(licenseModePath)) {
        OperationMode newOperationMode = defaultOperationMode;
        try {
            if (Files.exists(licenseModePath)
                && Files.isReadable(licenseModePath)) {
                final byte[] content;
                try {
                    content = Files.readAllBytes(licenseModePath);
                } catch (IOException e) {
                    logger.error(
                        (Supplier<?>) () -> new ParameterizedMessage(
                            "couldn't read operation mode from [{}]", licenseModePath.toAbsolutePath()), e);
                    return;
                }
                // this UTF-8 conversion is much pickier than java String
                final String operationMode = new BytesRef(content).utf8ToString();
                try {
                    newOperationMode = OperationMode.resolve(operationMode);
                }
            }
        }
    }
}

```

```

        } catch (IllegalArgumentException e) {
            logger.error(
                (Supplier<?>) () -> new ParameterizedMessage(
                    "invalid operation mode in [{ }]", licenseModePath.toAbsolutePath(), e);
            return;
        }
    }
} finally {
    // set this after the fact to prevent that we are jumping back and forth first setting to defaultl and then
reading the
    // actual op mode resetting it.
    this.currentOperationMode = newOperationMode;
}
onChange.run();
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetTrialStatusRequestBuilder extends ActionRequestBuilder<GetTrialStatusRequest,
    GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

    GetTrialStatusRequestBuilder(ElasticsearchClient client, GetTrialStatusAction action) {
        super(client, action, new GetTrialStatusRequest());
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.ValidateActions;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentType;

```

```

import java.io.IOException;

public class PutLicenseRequest extends AcknowledgedRequest<PutLicenseRequest> {

    private License license;
    private boolean acknowledge = false;

    public PutLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return (license == null) ? ValidateActions.addValidationError("license is missing", null) : null;
    }

    /**
     * Parses license from json format to an instance of { @link License}
     *
     * @param licenseDefinition licenses definition
     * @param xContentType the content type of the license
     */
    public PutLicenseRequest license(BytesReference licenseDefinition, XContentType xContentType) {
        try {
            return license(License.fromSource(licenseDefinition, xContentType));
        } catch (IOException e) {
            throw new IllegalArgumentException("failed to parse license source", e);
        }
    }

    public PutLicenseRequest license(License license) {
        this.license = license;
        return this;
    }

    public License license() {
        return license;
    }

    public PutLicenseRequest acknowledge(boolean acknowledge) {
        this.acknowledge = acknowledge;
        return this;
    }

    public boolean acknowledged() {
        return acknowledge;
    }
}

```



```

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    license = License.readLicense(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    license.writeTo(out);
    out.writeBoolean(acknowledge);
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;

import static org.elasticsearch.license.CryptUtils.decrypt;
import static org.elasticsearch.license.CryptUtils.encrypt;

class SelfGeneratedLicense {

    public static License create(License.Builder specBuilder) {
        License spec = specBuilder
            .issuer("elasticsearch")
            .version(License.VERSION_CURRENT)
            .build();
        final String signature;
        try {

```

```

XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
byte[] bytes = new byte[4 + 4 + encrypt.length];
ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
// always generate license version -VERSION_CURRENT
byteBuffer.putInt(-License.VERSION_CURRENT)
    .putInt(encrypt.length)
    .put(encrypt);
signature = Base64.getEncoder().encodeToString(bytes);
} catch (IOException e) {
    throw new IllegalStateException(e);
}
return License.builder().fromLicenseSpec(spec, signature).build();
}

```

```

public static boolean verify(final License license) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        int version = byteBuffer.getInt();
        int contentLen = byteBuffer.getInt();
        byte[] content = new byte[contentLen];
        byteBuffer.get(content);
        final License expectedLicense;
        // EMPTY is safe here because we don't call namedObject
        try (XContentParser parser = XContentFactory.xContent(XContentType.JSON)
            .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE,
decrypt(content))) {
            parser.nextToken();
            expectedLicense = License.builder().fromLicenseSpec(License.fromXContent(parser),
                license.signature().version(-version).build());
        }
        return license.equals(expectedLicense);
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
}

```

```

public static boolean validSelfGeneratedType(String type) {
    return "basic".equals(type) || "trial".equals(type);
}
}

```

/*

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```

*/
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartTrialLicense extends XPackRestHandler {

    RestPostStartTrialLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_trial", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        PostStartTrialRequest startTrialRequest = new PostStartTrialRequest();
        startTrialRequest.setType(request.param("type", "trial"));
        startTrialRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        return channel -> client.licensing().postStartTrial(startTrialRequest,
            new RestBuilderListener<PostStartTrialResponse>(channel) {
                @Override
                public RestResponse buildResponse(PostStartTrialResponse response, XContentBuilder builder) throws
                Exception {
                    PostStartTrialResponse.Status status = response.getStatus();
                    builder.startObject();
                    builder.field("acknowledged", startTrialRequest.isAcknowledged());
                    if (status.isTrialStarted()) {
                        builder.field("trial_was_started", true);
                        builder.field("type", startTrialRequest.getType());
                    } else {
                        builder.field("trial_was_started", false);
                        builder.field("error_message", status.getErrorMessage());
                    }
                }

                Map<String, String[]> acknowledgementMessages = response.getAcknowledgementMessages();

```

```

        if (acknowledgementMessages.isEmpty() == false) {
            builder.startObject("acknowledge");
            builder.field("message", response.getAcknowledgementMessage());
            for (Map.Entry<String, String[]> entry : acknowledgementMessages.entrySet()) {
                builder.startArray(entry.getKey());
                for (String message : entry.getValue()) {
                    builder.value(message);
                }
                builder.endArray();
            }
            builder.endObject();
        }
        builder.endObject();
        return new BytesRestResponse(status.getRestStatus(), builder);
    }
});
}

@Override
public String getName() {
    return "xpack_upgrade_to_trial_action";
}
}
/*
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetLicenseAction extends TransportMasterNodeReadAction<GetLicenseRequest,
GetLicenseResponse> {

    private final LicenseService licenseService;

```

```

@Inject
public TransportGetLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
    LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
    IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, GetLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
        GetLicenseRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@Override
protected GetLicenseResponse newResponse() {
    return new GetLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(GetLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}

@Override
protected void masterOperation(final GetLicenseRequest request, ClusterState state,
    final ActionListener<GetLicenseResponse> listener) throws ElasticsearchException {
    listener.onResponse(new GetLicenseResponse(licenseService.getLicense()));
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;

```

```

import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartBasicLicense extends XPackRestHandler {

    RestPostStartBasicLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_basic", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        PostStartBasicRequest startBasicRequest = new PostStartBasicRequest();
        startBasicRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        startBasicRequest.timeout(request.paramAsTime("timeout", startBasicRequest.timeout()));
        startBasicRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
startBasicRequest.masterNodeTimeout()));
        return channel -> client.licensing().postStartBasic(startBasicRequest, new
RestBuilderListener<PostStartBasicResponse>(channel) {
            @Override
            public RestResponse buildResponse(PostStartBasicResponse response, XContentBuilder builder) throws
Exception {
                PostStartBasicResponse.Status status = response.getStatus();
                response.toXContent(builder, ToXContent.EMPTY_PARAMS);
                return new BytesRestResponse(status.getRestStatus(), builder);
            }
        });
    }

    @Override
    public String getName() {
        return "xpack_start_basic_action";
    }
}
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*/
package org.elasticsearch.license;

import java.io.IOException;
import java.io.InputStream;

```

```

import java.nio.ByteBuffer;
import java.util.ArrayList;
import java.util.Base64;
import java.util.Comparator;
import java.util.List;
import java.util.Locale;

import org.apache.lucene.util.CollectionUtil;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Data structure for license. Use {@link Builder} to build a license.
 * Provides serialization/deserialization & validation methods for license object
 */
public class License implements ToXContentObject {
    public static final int VERSION_START = 1;
    public static final int VERSION_NO_FEATURE_TYPE = 2;
    public static final int VERSION_START_DATE = 3;
    public static final int VERSION_CURRENT = VERSION_START_DATE;

    /**
     * XContent param name to deserialize license(s) with
     * an additional <code>status</code> field, indicating whether a
     * particular license is 'active' or 'expired' and no signature
     * and in a human readable format
     */
    public static final String REST_VIEW_MODE = "rest_view";
    /**
     * XContent param name to deserialize license(s) with
     * no signature
     */
    public static final String LICENSE_SPEC_VIEW_MODE = "license_spec_view";
    /**
     * XContent param name to deserialize licenses according
     * to a specific license version

```

```

*/
public static final String LICENSE_VERSION_MODE = "license_version";

public static final Comparator<License> LATEST_ISSUE_DATE_FIRST =
Comparator.comparing(License::issueDate).reversed();

private final int version;
private final String uid;
private final String issuer;
private final String issuedTo;
private final long issueDate;
private final String type;
private final String subscriptionType;
private final String feature;
private final String signature;
private final long expiryDate;
private final long startDate;
private final int maxNodes;
private final OperationMode operationMode;

/**
 * Decouples operation mode of a license from the license type value.
 * <p>
 * Note: The mode indicates features that should be made available, but it does not indicate whether the license is
active!
 *
 * The id byte is used for ordering operation modes (used for merging license md in tribe node)
 */
public enum OperationMode {
    MISSING((byte) 0),
    TRIAL((byte) 1),
    BASIC((byte) 2),
    STANDARD((byte) 3),
    GOLD((byte) 4),
    PLATINUM((byte) 5);

    private final byte id;

    OperationMode(byte id) {
        this.id = id;
    }

    /** Returns non-zero positive number when <code>opMode1</code> is greater than <code>opMode2</code>
 */
    public static int compare(OperationMode opMode1, OperationMode opMode2) {
        return Integer.compare(opMode1.id, opMode2.id);
    }
}

```



```

public static OperationMode resolve(String type) {
    switch (type.toLowerCase(Locale.ROOT)) {
        case "missing":
            return MISSING;
        case "trial":
        case "none": // bwc for 1.x subscription_type field
        case "dev": // bwc for 1.x subscription_type field
        case "development": // bwc for 1.x subscription_type field
            return TRIAL;
        case "basic":
            return BASIC;
        case "standard":
            return STANDARD;
        case "silver":
        case "gold":
            return GOLD;
        case "platinum":
        case "cloud_internal":
        case "internal": // bwc for 1.x subscription_type field
            return PLATINUM;
        default:
            throw new IllegalArgumentException("unknown type [" + type + "]");
    }
}

private License(int version, String uid, String issuer, String issuedTo, long issueDate, String type,
                String subscriptionType, String feature, String signature, long expiryDate, int maxNodes, long startDate)
{
    this.version = version;
    this.uid = uid;
    this.issuer = issuer;
    this.issuedTo = issuedTo;
    this.issueDate = issueDate;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.feature = feature;
    this.signature = signature;
    // We will validate that only a basic license can have the
    BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
    // in the validate() method.
    if (expiryDate == -1) {
        this.expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        this.expiryDate = expiryDate;
    }
    this.maxNodes = maxNodes;
    this.startDate = startDate;
}

```

```

if (version == VERSION_START) {
    // in 1.x: the acceptable values for 'subscription_type': none | dev | silver | gold | platinum
    this.operationMode = OperationMode.resolve(subscriptionType);
} else {
    // in 2.x: the acceptable values for 'type': trial | basic | silver | dev | gold | platinum
    this.operationMode = OperationMode.resolve(type);
}
validate();
}

/**
 * @return version of the license
 */
public int version() {
    return version;
}

/**
 * @return a unique identifier for a license
 */
public String uid() {
    return uid;
}

/**
 * @return type of the license [trial, subscription, internal]
 */
public String type() {
    return type;
}

/**
 * @return the issueDate in milliseconds
 */
public long issueDate() {
    return issueDate;
}

/**
 * @return the startDate in milliseconds
 */
public long startDate() {
    return startDate;
}

/**
 * @return the expiry date in milliseconds
 */

```

```

public long expiryDate() {
    return expiryDate;
}

/**
 * @return the maximum number of nodes this license has been issued for
 */
public int maxNodes() {
    return maxNodes;
}

/**
 * @return a string representing the entity this licenses has been issued to
 */
public String issuedTo() {
    return issuedTo;
}

/**
 * @return a string representing the entity responsible for issuing this license (internal)
 */
public String issuer() {
    return issuer;
}

/**
 * @return a string representing the signature of the license used for license verification
 */
public String signature() {
    return signature;
}

/**
 * @return the operation mode of the license as computed from the license type or from
 * the license mode file
 */
public OperationMode operationMode() {
    synchronized (this) {
        if (canReadOperationModeFromFile() && operationModeFileWatcher != null) {
            return operationModeFileWatcher.getCurrentOperationMode();
        }
    }
    return operationMode;
}

private boolean canReadOperationModeFromFile() {
    return type.equals("cloud_internal");
}

```

```

private volatile OperationModeFileWatcher operationModeFileWatcher;

/**
 * Sets the operation mode file watcher for the license and initializes the
 * file watcher when the license type allows to override operation mode from file
 */
public synchronized void setOperationModeFileWatcher(final OperationModeFileWatcher
operationModeFileWatcher) {
    this.operationModeFileWatcher = operationModeFileWatcher;
    if (canReadOperationModeFromFile()) {
        this.operationModeFileWatcher.init();
    }
}

/**
 * Removes operation mode file watcher, so unused license objects can be gc'ed
 */
public synchronized void removeOperationModeFileWatcher() {
    this.operationModeFileWatcher = null;
}

/**
 * @return the current license's status
 */
public Status status() {
    long now = System.currentTimeMillis();
    if (issueDate > now) {
        return Status.INVALID;
    } else if (expiryDate < now) {
        return Status.EXPIRED;
    }
    return Status.ACTIVE;
}

private void validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (subscriptionType == null && version == VERSION_START) {
        throw new IllegalStateException("subscriptionType can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    }
}

```

```

    } else if (feature == null && version == VERSION_START) {
        throw new IllegalStateException("feature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    } else if (expiryDate == LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
&& "basic".equals(type) == false) {
        throw new IllegalStateException("only basic licenses are allowed to have no expiration");
    }
}
}

```

```

public static License readLicense(StreamInput in) throws IOException {
    int version = in.readVInt(); // Version for future extensibility
    if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
elasticsearch-license" +
            " plugin");
    }
    Builder builder = builder();
    builder.version(version);
    builder.uid(in.readString());
    builder.type(in.readString());
    if (version == VERSION_START) {
        builder.subscriptionType(in.readString());
    }
    builder.issueDate(in.readLong());
    if (version == VERSION_START) {
        builder.feature(in.readString());
    }
    builder.expiryDate(in.readLong());
    builder.maxNodes(in.readInt());
    builder.issuedTo(in.readString());
    builder.issuer(in.readString());
    builder.signature(in.readOptionalString());
    if (version >= VERSION_START_DATE) {
        builder.startDate(in.readLong());
    }
    return builder.build();
}
}

```

```

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(version);
    out.writeString(uid);
    out.writeString(type);
    if (version == VERSION_START) {
        out.writeString(subscriptionType);
    }
}
}

```

```

out.writeLong(issueDate);
if (version == VERSION_START) {
    out.writeString(feature);
}
out.writeLong(expiryDate);
out.writeInt(maxNodes);
out.writeString(issuedTo);
out.writeString(issuer);
out.writeOptionalString(signature);
if (version >= VERSION_START_DATE) {
    out.writeLong(startDate);
}
}

```

@Override

```

public String toString() {
    try {
        final XContentBuilder builder = XContentFactory.jsonBuilder();
        toXContent(builder, ToXContent.EMPTY_PARAMS);
        return Strings.toString(builder);
    } catch (IOException e) {
        return "";
    }
}

```

@Override

```

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    toInnerXContent(builder, params);
    builder.endObject();
    return builder;
}

```

```

public XContentBuilder toInnerXContent(XContentBuilder builder, Params params) throws IOException {
    boolean licenseSpecMode = params.paramAsBoolean(LICENSE_SPEC_VIEW_MODE, false);
    boolean restViewMode = params.paramAsBoolean(REST_VIEW_MODE, false);
    boolean previouslyHumanReadable = builder.humanReadable();
    if (licenseSpecMode && restViewMode) {
        throw new IllegalArgumentException("can have either " + REST_VIEW_MODE + " or " +
LICENSE_SPEC_VIEW_MODE);
    } else if (restViewMode) {
        if (!previouslyHumanReadable) {
            builder.humanReadable(true);
        }
    }
    final int version;
    if (params.param(LICENSE_VERSION_MODE) != null && restViewMode) {
        version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
    }
}

```

```

    } else {
        version = this.version;
    }
    if (restViewMode) {
        builder.field(Fields.STATUS, status().label());
    }
    builder.field(Fields.UID, uid);
    builder.field(Fields.TYPE, type);
    if (version == VERSION_START) {
        builder.field(Fields.SUBSCRIPTION_TYPE, subscriptionType);
    }
    builder.timeField(Fields.ISSUE_DATE_IN_MILLIS, Fields.ISSUE_DATE, issueDate);
    if (version == VERSION_START) {
        builder.field(Fields.FEATURE, feature);
    }

    if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
        builder.timeField(Fields.EXPIRY_DATE_IN_MILLIS, Fields.EXPIRY_DATE, expiryDate);
    }
    builder.field(Fields.MAX_NODES, maxNodes);
    builder.field(Fields.ISSUED_TO, issuedTo);
    builder.field(Fields.ISSUER, issuer);
    if (!licenseSpecMode && !restViewMode && signature != null) {
        builder.field(Fields.SIGNATURE, signature);
    }
    if (restViewMode) {
        builder.humanReadable(previouslyHumanReadable);
    }
    if (version >= VERSION_START_DATE) {
        builder.timeField(Fields.START_DATE_IN_MILLIS, Fields.START_DATE, startDate);
    }
    return builder;
}

```

```

public static License fromXContent(XContentParser parser) throws IOException {
    Builder builder = new Builder();
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            token = parser.nextToken();
            if (token.isValue()) {
                if (Fields.UID.equals(currentFieldName)) {
                    builder.uid(parser.text());
                } else if (Fields.TYPE.equals(currentFieldName)) {
                    builder.type(parser.text());
                } else if (Fields.SUBSCRIPTION_TYPE.equals(currentFieldName)) {
                    builder.subscriptionType(parser.text());
                }
            }
        }
    }
}

```

```

    } else if (Fields.ISSUE_DATE.equals(currentFieldName)) {
        builder.issueDate(parseDate(parser, "issue", false));
    } else if (Fields.ISSUE_DATE_IN_MILLIS.equals(currentFieldName)) {
        builder.issueDate(parser.longValue());
    } else if (Fields.FEATURE.equals(currentFieldName)) {
        builder.feature(parser.text());
    } else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
        builder.expiryDate(parseDate(parser, "expiration", true));
    } else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
        builder.expiryDate(parser.longValue());
    } else if (Fields.START_DATE.equals(currentFieldName)) {
        builder.startDate(parseDate(parser, "start", false));
    } else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
        builder.startDate(parser.longValue());
    } else if (Fields.MAX_NODES.equals(currentFieldName)) {
        builder.maxNodes(parser.intValue());
    } else if (Fields.ISSUED_TO.equals(currentFieldName)) {
        builder.issuedTo(parser.text());
    } else if (Fields.ISSUER.equals(currentFieldName)) {
        builder.issuer(parser.text());
    } else if (Fields.SIGNATURE.equals(currentFieldName)) {
        builder.signature(parser.text());
    } else if (Fields.VERSION.equals(currentFieldName)) {
        builder.version(parser.intValue());
    }
    // Ignore unknown elements - might be new version of license
} else if (token == XContentParser.Token.START_ARRAY) {
    // It was probably created by newer version - ignoring
    parser.skipChildren();
} else if (token == XContentParser.Token.START_OBJECT) {
    // It was probably created by newer version - ignoring
    parser.skipChildren();
}
}
}
// not a license spec
if (builder.signature != null) {
    byte[] signatureBytes = Base64.getDecoder().decode(builder.signature);
    ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
    int version = byteBuffer.getInt();
    // we take the absolute version, because negative versions
    // mean that the license was generated by the cluster (see TrialLicense)
    // and positive version means that the license was signed
    if (version < 0) {
        version *= -1;
    }
    if (version == 0) {
        throw new ElasticsearchException("malformed signature for license [" + builder.uid + "]);
    }
}

```



```

    } else if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
" +
        "elasticsearch-license plugin");
    }
    // signature version is the source of truth
    builder.version(version);
}
return builder.build();
}

/**
 * Returns true if the license was auto-generated (by license plugin),
 * false otherwise
 */
public static boolean isAutoGeneratedLicense(String signature) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(signature);
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        return byteBuffer.getInt() < 0;
    } catch (IllegalArgumentException e) {
        throw new IllegalStateException(e);
    }
}

public static License fromSource(BytesReference bytes, XContentType xContentType) throws IOException {
    if (bytes == null || bytes.length() == 0) {
        throw new ElasticsearchParseException("failed to parse license - no content provided");
    }
    if (xContentType == null) {
        throw new ElasticsearchParseException("failed to parse license - no content-type provided");
    }
    // EMPTY is safe here because we don't call namedObject
    try (InputStream byteStream = bytes.streamInput();
        XContentTypeParser parser = xContentType.xContent()
            .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE, byteStream))
    {
        License license = null;
        if (parser.nextToken() == XContentTypeParser.Token.START_OBJECT) {
            if (parser.nextToken() == XContentTypeParser.Token.FIELD_NAME) {
                String currentFieldName = parser.currentName();
                if (Fields.LICENSES.equals(currentFieldName)) {
                    final List<License> pre20Licenses = new ArrayList<>();
                    if (parser.nextToken() == XContentTypeParser.Token.START_ARRAY) {
                        while (parser.nextToken() != XContentTypeParser.Token.END_ARRAY) {
                            pre20Licenses.add(License.fromXContent(parser));
                        }
                    }
                    // take the latest issued unexpired license

```

```

        CollectionUtil.timSort(pre20Licenses, LATEST_ISSUE_DATE_FIRST);
        long now = System.currentTimeMillis();
        for (License oldLicense : pre20Licenses) {
            if (oldLicense.expiryDate() > now) {
                license = oldLicense;
                break;
            }
        }
        if (license == null && !pre20Licenses.isEmpty()) {
            license = pre20Licenses.get(0);
        }
    } else {
        throw new ElasticsearchParseException("failed to parse licenses expected an array of licenses");
    }
    } else if (Fields.LICENSE.equals(currentFieldName)) {
        license = License.fromXContent(parser);
    }
    // Ignore all other fields - might be created with new version
    } else {
        throw new ElasticsearchParseException("failed to parse licenses expected field");
    }
    } else {
        throw new ElasticsearchParseException("failed to parse licenses expected start object");
    }
    }
    return license;
}
}

```

@Override

```

public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    License license = (License) o;

    if (issueDate != license.issueDate) return false;
    if (expiryDate != license.expiryDate) return false;
    if (startDate != license.startDate) return false;
    if (maxNodes != license.maxNodes) return false;
    if (version != license.version) return false;
    if (uid != null ? !uid.equals(license.uid) : license.uid != null) return false;
    if (issuer != null ? !issuer.equals(license.issuer) : license.issuer != null) return false;
    if (issuedTo != null ? !issuedTo.equals(license.issuedTo) : license.issuedTo != null) return false;
    if (type != null ? !type.equals(license.type) : license.type != null) return false;
    if (subscriptionType != null ? !subscriptionType.equals(license.subscriptionType) : license.subscriptionType !=
null)
        return false;
    if (feature != null ? !feature.equals(license.feature) : license.feature != null) return false;
}

```

```

        return !(signature != null ? !signature.equals(license.signature) : license.signature != null);
    }

    @Override
    public int hashCode() {
        int result = uid != null ? uid.hashCode() : 0;
        result = 31 * result + (issuer != null ? issuer.hashCode() : 0);
        result = 31 * result + (issuedTo != null ? issuedTo.hashCode() : 0);
        result = 31 * result + (int) (issueDate ^ (issueDate >>> 32));
        result = 31 * result + (type != null ? type.hashCode() : 0);
        result = 31 * result + (subscriptionType != null ? subscriptionType.hashCode() : 0);
        result = 31 * result + (feature != null ? feature.hashCode() : 0);
        result = 31 * result + (signature != null ? signature.hashCode() : 0);
        result = 31 * result + (int) (expiryDate ^ (expiryDate >>> 32));
        result = 31 * result + (int) (startDate ^ (startDate >>> 32));
        result = 31 * result + maxNodes;
        result = 31 * result + version;
        return result;
    }

    public static final class Fields {
        public static final String STATUS = "status";
        public static final String UID = "uid";
        public static final String TYPE = "type";
        public static final String SUBSCRIPTION_TYPE = "subscription_type";
        public static final String ISSUE_DATE_IN_MILLIS = "issue_date_in_millis";
        public static final String ISSUE_DATE = "issue_date";
        public static final String FEATURE = "feature";
        public static final String EXPIRY_DATE_IN_MILLIS = "expiry_date_in_millis";
        public static final String EXPIRY_DATE = "expiry_date";
        public static final String START_DATE_IN_MILLIS = "start_date_in_millis";
        public static final String START_DATE = "start_date";
        public static final String MAX_NODES = "max_nodes";
        public static final String ISSUED_TO = "issued_to";
        public static final String ISSUER = "issuer";
        public static final String VERSION = "version";
        public static final String SIGNATURE = "signature";

        public static final String LICENSES = "licenses";
        public static final String LICENSE = "license";
    }

    private static long parseDate(XContentParser parser, String description, boolean endOfTheDay) throws
    IOException {
        if (parser.currentToken() == XContentParser.Token.VALUE_NUMBER) {
            return parser.longValue();
        }
    }

```

```

    } else {
        try {
            if (endOfDay) {
                return DateUtils.endOfDay(parser.text());
            } else {
                return DateUtils.beginningOfDay(parser.text());
            }
        } catch (IllegalArgumentException ex) {
            throw new ElasticsearchParseException("invalid " + description + " date format " + parser.text());
        }
    }
}

```

```

public static Builder builder() {
    return new Builder();
}

```

```

public static class Builder {
    private int version = License.VERSION_CURRENT;
    private String uid;
    private String issuer;
    private String issuedTo;
    private long issueDate = -1;
    private String type;
    private String subscriptionType;
    private String feature;
    private String signature;
    private long expiryDate = -1;
    private long startDate = -1;
    private int maxNodes = -1;

```

```

    public Builder uid(String uid) {
        this.uid = uid;
        return this;
    }

```

```

    public Builder version(int version) {
        this.version = version;
        return this;
    }

```

```

    public Builder issuer(String issuer) {
        this.issuer = issuer;
        return this;
    }

```

```

    public Builder issuedTo(String issuedTo) {
        this.issuedTo = issuedTo;
    }

```

```

        return this;
    }

    public Builder issueDate(long issueDate) {
        this.issueDate = issueDate;
        return this;
    }

    public Builder type(String type) {
        this.type = type;
        return this;
    }

    public Builder subscriptionType(String subscriptionType) {
        this.subscriptionType = subscriptionType;
        return this;
    }

    public Builder feature(String feature) {
        this.feature = feature;
        return this;
    }

    public Builder expiryDate(long expiryDate) {
        this.expiryDate = expiryDate;
        return this;
    }

    public Builder maxNodes(int maxNodes) {
        this.maxNodes = maxNodes;
        return this;
    }

    public Builder signature(String signature) {
        if (signature != null) {
            this.signature = signature;
        }
        return this;
    }

    public Builder startDate(long startDate) {
        this.startDate = startDate;
        return this;
    }

    public Builder fromLicenseSpec(License license, String signature) {
        return uid(license.uid())
            .version(license.version())

```

```

        .issuedTo(license.issuedTo())
        .issueDate(license.issueDate())
        .startDate(license.startDate())
        .type(license.type())
        .subscriptionType(license.subscriptionType)
        .feature(license.feature)
        .maxNodes(license.maxNodes())
        .expiryDate(license.expiryDate())
        .issuer(license.issuer())
        .signature(signature);
    }

/**
 * Returns a builder that converts pre 2.0 licenses
 * to the new license format
 */
public Builder fromPre20LicenseSpec(License pre20License) {
    return uid(pre20License.uid())
        .issuedTo(pre20License.issuedTo())
        .issueDate(pre20License.issueDate())
        .maxNodes(pre20License.maxNodes())
        .expiryDate(pre20License.expiryDate());
}

public License build() {
    return new License(version, uid, issuer, issuedTo, issueDate, type,
        subscriptionType, feature, signature, expiryDate, maxNodes, startDate);
}

public Builder validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (signature == null) {
        throw new IllegalStateException("signature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    }
    return this;
}

```

```

    }
}

public enum Status {

    ACTIVE("active"),
    INVALID("invalid"),
    EXPIRED("expired");

    private final String label;

    Status(String label) {
        this.label = label;
    }

    public String label() {
        return label;
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(label);
    }

    public static Status readFrom(StreamInput in) throws IOException {
        String value = in.readString();
        switch (value) {
            case "active":
                return ACTIVE;
            case "invalid":
                return INVALID;
            case "expired":
                return EXPIRED;
            default:
                throw new IllegalArgumentException("unknown license status [" + value + "]");
        }
    }
}

/**
 * Returns <code>>true</code> iff the license is a production license
 */
public boolean isProductionLicense() {
    switch (operationMode()) {
        case MISSING:
        case TRIAL:
        case BASIC:
            return false;
        case STANDARD:
    }
}

```

```

    case GOLD:
    case PLATINUM:
        return true;
    default:
        throw new AssertionError("unknown operation mode: " + operationMode());
    }
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestController.Method.POST;
import static org.elasticsearch.rest.RestController.Method.PUT;

public class RestPutLicenseAction extends XPackRestHandler {
    public RestPutLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(POST, URI_BASE + "/license", this,
            POST, "_license", deprecationLogger);
        controller.registerWithDeprecatedHandler(PUT, URI_BASE + "/license", this,
            PUT, "_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(POST, "_licenses", this,
            "[POST /_licenses] is deprecated! Use " +
            "[POST /_xpack/license] instead.",
            deprecationLogger);
        controller.registerAsDeprecatedHandler(PUT, "_licenses", this,
            "[PUT /_licenses] is deprecated! Use " +
            "[PUT /_xpack/license] instead.",
            deprecationLogger);
    }
}

```



```

@Override
public String getName() {
    return "xpack_put_license_action";
}

@Override
public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
IOException {
    if (request.hasContent() == false) {
        throw new IllegalArgumentException("The license must be provided in the request body");
    }
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest();
    putLicenseRequest.license(request.content(), request.getXContentType());
    putLicenseRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
    putLicenseRequest.timeout(request.paramAsTime("timeout", putLicenseRequest.timeout()));
    putLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
putLicenseRequest.masterNodeTimeout()));

    if ("basic".equals(putLicenseRequest.license().type())) {
        throw new IllegalArgumentException("Installing basic licenses is no longer allowed. Use the POST " +
            "/_xpack/license/start_basic API to install a basic license that does not expire.");
    }

    return channel -> client.es().admin().cluster().execute(PutLicenseAction.INSTANCE, putLicenseRequest,
        new RestToXContentListener<>(channel));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class GetLicenseResponse extends ActionResponse {

    private License license;

    GetLicenseResponse() {
    }

    GetLicenseResponse(License license) {

```

```

        this.license = license;
    }

    public License license() {
        return license;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.readBoolean()) {
            license = License.readLicense(in);
        }
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        if (license == null) {
            out.writeBoolean(false);
        } else {
            out.writeBoolean(true);
            license.writeTo(out);
        }
    }
}

/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.MasterNodeReadOperationRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseRequestBuilder extends MasterNodeReadOperationRequestBuilder<GetLicenseRequest,
GetLicenseResponse,
    GetLicenseRequestBuilder> {

    public GetLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, GetLicenseAction.INSTANCE);
    }

    /**
     * Creates new get licenses request builder
     */

```

```

    * @param client elasticsearch client
    */
    public GetLicenseRequestBuilder(ElasticsearchClient client, GetLicenseAction action) {
        super(client, action, new GetLicenseRequest());
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetLicenseRequest extends MasterNodeReadRequest<GetLicenseRequest> {

    public GetLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartTrialAction extends TransportMasterNodeAction<PostStartTrialRequest,

```

```

PostStartTrialResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartTrialAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartTrialAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, PostStartTrialRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartTrialResponse newResponse() {
        return new PostStartTrialResponse();
    }

    @Override
    protected void masterOperation(PostStartTrialRequest request, ClusterState state,
                                   ActionListener<PostStartTrialResponse> listener) throws Exception {
        licenseService.startTrialLicense(request, listener);
    }

    @Override
    protected ClusterBlockException checkBlock(PostStartTrialRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;

```

```

import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.GET;
import static org.elasticsearch.rest.RestStatus.NOT_FOUND;
import static org.elasticsearch.rest.RestStatus.OK;

public class RestGetLicenseAction extends XPackRestHandler {

    @Inject
    public RestGetLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(GET, URI_BASE + "/license", this,
            GET, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(GET, "/_licenses", this,
            "[GET /_licenses] is deprecated! Use " +
            "[GET /_xpack/license] instead.",
            deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_get_license_action";
    }

    /**
     * There will be only one license displayed per feature, the selected license will have the latest expiry_date
     * out of all other licenses for the feature.
     * <p>
     * The licenses are sorted by latest issue_date
     */
    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        final Map<String, String> overrideParams = new HashMap<>(2);
        overrideParams.put(License.REST_VIEW_MODE, "true");
        overrideParams.put(License.LICENSE_VERSION_MODE, String.valueOf(License.VERSION_CURRENT));
        final ToXContent.Params params = new ToXContent.DelegatingMapParams(overrideParams, request);
    }
}

```

```

        GetLicenseRequest getLicenseRequest = new GetLicenseRequest();
        getLicenseRequest.local(request.paramAsBoolean("local", getLicenseRequest.local()));
        return channel -> client.es().admin().cluster().execute(GetLicenseAction.INSTANCE, getLicenseRequest,
            new RestBuilderListener<GetLicenseResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetLicenseResponse response, XContentBuilder builder) throws
Exception {
                    // Default to pretty printing, but allow ?pretty=false to disable
                    if (!request.hasParam("pretty")) {
                        builder.prettyPrint().IfAtEnd();
                    }
                    boolean hasLicense = response.license() != null;
                    builder.startObject();
                    if (hasLicense) {
                        builder.startObject("license");
                        response.license().toInnerXContent(builder, params);
                        builder.endObject();
                    }
                    builder.endObject();
                    return new BytesRestResponse(hasLicense ? OK : NOT_FOUND, builder);
                }
            });
    }

}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Register license request builder
 */
public class PutLicenseRequestBuilder extends AcknowledgedRequestBuilder<PutLicenseRequest,
PutLicenseResponse, PutLicenseRequestBuilder> {

    public PutLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, PutLicenseAction.INSTANCE);
    }

}

/**

```

```

* Constructs register license request
*
* @param client elasticsearch client
*/
public PutLicenseRequestBuilder(ElasticsearchClient client, PutLicenseAction action) {
    super(client, action, new PutLicenseRequest());
}

/**
* Sets the license
*
* @param license license
* @return this builder
*/
public PutLicenseRequestBuilder setLicense(License license) {
    request.license(license);
    return this;
}

public PutLicenseRequestBuilder setLicense(BytesReference licenseSource, XContentType xContentType) {
    request.license(licenseSource, xContentType);
    return this;
}

public PutLicenseRequestBuilder setAcknowledge(boolean acknowledge) {
    request.acknowledge(acknowledge);
    return this;
}
}
}
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetBasicStatusAction extends Action<GetBasicStatusRequest, GetBasicStatusResponse,
GetBasicStatusRequestBuilder> {

    public static final GetBasicStatusAction INSTANCE = new GetBasicStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/basic_status";

    private GetBasicStatusAction() {
        super(NAME);
    }
}

```

```

@Override
public GetBasicStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new GetBasicStatusRequestBuilder(client, this);
}

@Override
public GetBasicStatusResponse newResponse() {
    return new GetBasicStatusResponse();
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.rest.RestStatus;

public class LicenseUtils {

    public static final String EXPIRED_FEATURE_METADATA = "es.license.expired.feature";

    /**
     * Exception to be thrown when a feature action requires a valid license, but license
     * has expired
     *
     * <code>feature</code> accessible through { @link #EXPIRED_FEATURE_METADATA } in the
     * exception's rest header
     */
    public static ElasticsearchSecurityException newComplianceException(String feature) {
        ElasticsearchSecurityException e = new ElasticsearchSecurityException("current license is non-compliant for
[{}]",
            RestStatus.FORBIDDEN, feature);
        e.addMetadata(EXPIRED_FEATURE_METADATA, feature);
        return e;
    }

    /**
     * Checks if a given { @link ElasticsearchSecurityException } refers to a feature that
     * requires a valid license, but the license has expired.
     */
    public static boolean isLicenseExpiredException(ElasticsearchSecurityException exception) {
        return (exception != null) && (exception.getMetadata(EXPIRED_FEATURE_METADATA) != null);
    }
}

```



```

    public static boolean licenseNeedsExtended(License license) {
        return "basic".equals(license.type()) && license.expiryDate() !=
LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    }
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequest;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.ParseField;
import org.elasticsearch.common.io.stream.NamedWriteableRegistry;
import org.elasticsearch.common.settings.ClusterSettings;
import org.elasticsearch.common.settings.IndexScopedSettings;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.settings.SettingsFilter;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.plugins.ActionPlugin;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestHandler;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.function.Supplier;

import static org.elasticsearch.xpack.core.XPackClientActionPlugin.isTribeNode;
import static org.elasticsearch.xpack.core.XPackPlugin.transportClientMode;

public class Licensing implements ActionPlugin {

    public static final String NAME = "license";
    protected final Settings settings;
    private final boolean isTransportClient;
    private final boolean isTribeNode;

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
    to this file

```

```

// are also carried out in XPackClientPlugin.java
public List<NamedWriteableRegistry.Entry> getNamedWriteables() {
    List<NamedWriteableRegistry.Entry> entries = new ArrayList<>();
    entries.add(new NamedWriteableRegistry.Entry(MetaData.Custom.class, LicensesMetaData.TYPE,
LicensesMetaData::new));
    entries.add(new NamedWriteableRegistry.Entry(NamedDiff.class, LicensesMetaData.TYPE,
LicensesMetaData::readDiffFrom));
    return entries;
}

// Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
to this file
// are also carried out in XPackClientPlugin.java
public List<NamedXContentRegistry.Entry> getNamedXContent() {
    List<NamedXContentRegistry.Entry> entries = new ArrayList<>();
    // Metadata
    entries.add(new NamedXContentRegistry.Entry(MetaData.Custom.class, new
ParseField(LicensesMetaData.TYPE),
    LicensesMetaData::fromXContent));
    return entries;
}

public Licensing(Settings settings) {
    this.settings = settings;
    isTransportClient = transportClientMode(settings);
    isTribeNode = isTribeNode(settings);
}

@Override
public List<ActionHandler<? extends ActionRequest, ? extends ActionResponse>> getActions() {
    if (isTribeNode) {
        return Collections.singletonList(new ActionHandler<>(GetLicenseAction.INSTANCE,
TransportGetLicenseAction.class));
    }
    return Arrays.asList(new ActionHandler<>(PutLicenseAction.INSTANCE, TransportPutLicenseAction.class),
        new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class),
        new ActionHandler<>(DeleteLicenseAction.INSTANCE, TransportDeleteLicenseAction.class),
        new ActionHandler<>(PostStartTrialAction.INSTANCE, TransportPostStartTrialAction.class),
        new ActionHandler<>(GetTrialStatusAction.INSTANCE, TransportGetTrialStatusAction.class),
        new ActionHandler<>(PostStartBasicAction.INSTANCE, TransportPostStartBasicAction.class),
        new ActionHandler<>(GetBasicStatusAction.INSTANCE, TransportGetBasicStatusAction.class));
}

@Override
public List<RestHandler> getRestHandlers(Settings settings, RestController restController, ClusterSettings
clusterSettings,
    IndexScopedSettings indexScopedSettings, SettingsFilter settingsFilter, IndexNameExpressionResolver
indexNameExpressionResolver,

```

```

    Supplier<DiscoveryNodes> nodesInCluster) {
List<RestHandler> handlers = new ArrayList<>();
handlers.add(new RestGetLicenseAction(settings, restController));
if (false == isTribeNode) {
    handlers.add(new RestPutLicenseAction(settings, restController));
    handlers.add(new RestDeleteLicenseAction(settings, restController));
    handlers.add(new RestGetTrialStatus(settings, restController));
    handlers.add(new RestGetBasicStatus(settings, restController));
    handlers.add(new RestPostStartTrialLicense(settings, restController));
    handlers.add(new RestPostStartBasicLicense(settings, restController));
}
return handlers;
}

// Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
to this file
// are also carried out in XPackClientPlugin.java
public List<Setting<?>> getSettings() {
    // TODO convert this wildcard to a real setting
    return Collections.singletonList(Setting.groupSetting("license.", Setting.Property.NodeScope));
}

}
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*/
package org.elasticsearch.license;

import javax.crypto.BadPaddingException;
import javax.crypto.Cipher;
import javax.crypto.IllegalBlockSizeException;
import javax.crypto.NoSuchPaddingException;
import javax.crypto.SecretKey;
import javax.crypto.SecretKeyFactory;
import javax.crypto.spec.PBEKeySpec;
import javax.crypto.spec.SecretKeySpec;
import java.nio.charset.StandardCharsets;
import java.security.InvalidKeyException;
import java.security.KeyFactory;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.spec.InvalidKeySpecException;

```

```

import java.security.spec.PKCS8EncodedKeySpec;
import java.security.spec.X509EncodedKeySpec;
import java.util.Base64;

public class CryptUtils {
    private static final int minimumPadding = 20;
    private static final byte[] salt = {
        (byte) 0xA9, (byte) 0xA2, (byte) 0xB5, (byte) 0xDE,
        (byte) 0x2A, (byte) 0x8A, (byte) 0x9A, (byte) 0xE6
    };
    private static final int iterationCount = 1024;
    private static final int aesKeyLength = 128;
    private static final String keyAlgorithm = "RSA";
    private static final String passHashAlgorithm = "SHA-512";
    private static final String DEFAULT_PASS_PHRASE = "elasticsearch-license";

    private static final SecureRandom random = new SecureRandom();

    /**
     * Read encrypted private key file content with default pass phrase
     */
    public static PrivateKey readEncryptedPrivateKey(byte[] fileContents) {
        try {
            return readEncryptedPrivateKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
        } catch (NoSuchAlgorithmException e) {
            throw new IllegalStateException(e);
        }
    }

    /**
     * Read encrypted public key file content with default pass phrase
     */
    public static PublicKey readEncryptedPublicKey(byte[] fileContents) {
        try {
            return readEncryptedPublicKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
        } catch (NoSuchAlgorithmException e) {
            throw new IllegalStateException(e);
        }
    }

    /**
     * Returns encrypted public key file content with default pass phrase
     */
    public static byte[] writeEncryptedPublicKey(PublicKey publicKey) {
        try {
            return writeEncryptedPublicKey(publicKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
        } catch (NoSuchAlgorithmException e) {
            throw new IllegalStateException(e);
        }
    }
}

```

```

    }
}

/**
 * Returns encrypted private key file content with default pass phrase
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey) {
    try {
        return writeEncryptedPrivateKey(privateKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Read encrypted private key file content with provided <code>passPhrase</code>
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents, char[] passPhrase) {
    PKCS8EncodedKeySpec privateKeySpec = new PKCS8EncodedKeySpec(decrypt(fileContents, passPhrase));
    try {
        return KeyFactory.getInstance(keyAlgorithm).generatePrivate(privateKeySpec);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Read encrypted public key file content with provided <code>passPhrase</code>
 */
public static PublicKey readEncryptedPublicKey(byte[] fileContents, char[] passPhrase) {
    X509EncodedKeySpec publicKeySpec = new X509EncodedKeySpec(decrypt(fileContents, passPhrase));
    try {
        return KeyFactory.getInstance(CryptUtils.keyAlgorithm).generatePublic(publicKeySpec);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Returns encrypted public key file content with provided <code>passPhrase</code>
 */
public static byte[] writeEncryptedPublicKey(PublicKey publicKey, char[] passPhrase) {
    X509EncodedKeySpec encodedKeySpec = new X509EncodedKeySpec(publicKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
 * Returns encrypted private key file content with provided <code>passPhrase</code>

```

```

*/
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey, char[] passPhrase) {
    PKCS8EncodedKeySpec encodedKeySpec = new PKCS8EncodedKeySpec(privateKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
 * Encrypts provided <code>data</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
public static byte[] encrypt(byte[] data) {
    try {
        return encrypt(data, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
public static byte[] decrypt(byte[] encryptedData) {
    try {
        return decrypt(encryptedData, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Encrypts provided <code>data</code> with <code>passPhrase</code>
 */
public static byte[] encrypt(byte[] data, char[] passPhrase) {
    try {
        final Cipher encryptionCipher = getEncryptionCipher(getSecretKey(passPhrase));
        return encryptionCipher.doFinal(pad(data, minimumPadding));
    } catch (InvalidKeySpecException | IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>passPhrase</code>
 */
private static byte[] decrypt(byte[] encryptedData, char[] passPhrase) {
    try {
        final Cipher cipher = getDecryptionCipher(getSecretKey(passPhrase));
        return unPad(cipher.doFinal(encryptedData));
    } catch (IllegalBlockSizeException | BadPaddingException | InvalidKeySpecException e) {

```

```

        throw new IllegalStateException(e);
    }
}

private static SecretKey getSecretKey(char[] passphrase) throws InvalidKeySpecException {
    try {
        PBEKeySpec keySpec = new PBEKeySpec(passphrase, salt, iterationCount, aesKeyLength);

        byte[] shortKey = SecretKeyFactory.getInstance("PBESWithSHA1AndDESede").
            generateSecret(keySpec).getEncoded();

        byte[] intermediaryKey = new byte[aesKeyLength / 8];
        for (int i = 0, j = 0; i < aesKeyLength / 8; i++) {
            intermediaryKey[i] = shortKey[j];
            if (++j == shortKey.length)
                j = 0;
        }

        return new SecretKeySpec(intermediaryKey, "AES");
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

private static Cipher getEncryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.ENCRYPT_MODE, secretKey);
}

private static Cipher getDecryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.DECRYPT_MODE, secretKey);
}

private static Cipher getCipher(int mode, SecretKey secretKey) {
    try {
        Cipher cipher = Cipher.getInstance(secretKey.getAlgorithm());
        cipher.init(mode, secretKey, random);
        return cipher;
    } catch (NoSuchAlgorithmException | InvalidKeyException | NoSuchPaddingException e) {
        throw new IllegalStateException(e);
    }
}

private static byte[] pad(byte[] bytes, int length) {
    if (bytes.length >= length) {
        byte[] out = new byte[bytes.length + 1];
        System.arraycopy(bytes, 0, out, 0, bytes.length);
        out[bytes.length] = (byte) 1;
    }
}

```

```

        return out;
    }

    byte[] out = new byte[length + 1];

    int i = 0;
    for (; i < bytes.length; i++)
        out[i] = bytes[i];

    int padded = length - i;

    // fill the rest with random bytes
    byte[] fill = new byte[padded - 1];
    random.nextBytes(fill);
    System.arraycopy(fill, 0, out, i, padded - 1);

    out[length] = (byte) (padded + 1);

    return out;
}

private static byte[] unPad(byte[] bytes) {
    int padded = (int) bytes[bytes.length - 1];
    int targetLength = bytes.length - padded;

    byte[] out = new byte[targetLength];

    System.arraycopy(bytes, 0, out, 0, targetLength);

    return out;
}

private static char[] hashPassPhrase(String passPhrase) throws NoSuchAlgorithmException {
    final byte[] passBytes = passPhrase.getBytes(StandardCharsets.UTF_8);
    final byte[] digest = MessageDigest.getInstance(passHashAlgorithm).digest(passBytes);
    return Base64.getEncoder().encodeToString(digest).toCharArray();
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;

```



```

import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

class PostStartTrialResponse extends ActionResponse {

    // Nodes Prior to 6.3 did not have NEED_ACKNOWLEDGEMENT as part of status
    enum Pre63Status {
        UPGRADED_TO_TRIAL,
        TRIAL_ALREADY_ACTIVATED;
    }
    enum Status {
        UPGRADED_TO_TRIAL(true, null, RestStatus.OK),
        TRIAL_ALREADY_ACTIVATED(false, "Operation failed: Trial was already activated.",
RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

        private final boolean isTrialStarted;

        private final String errorMessage;
        private final RestStatus restStatus;
        Status(boolean isTrialStarted, String errorMessage, RestStatus restStatus) {
            this.isTrialStarted = isTrialStarted;
            this.errorMessage = errorMessage;
            this.restStatus = restStatus;
        }

        boolean isTrialStarted() {
            return isTrialStarted;
        }

        String getErrorMessage() {
            return errorMessage;
        }

        RestStatus getRestStatus() {
            return restStatus;
        }

    }

    private Status status;
    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeMessage;

```

```

PostStartTrialResponse() {
}

PostStartTrialResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartTrialResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage)
{
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    status = in.readEnum(Status.class);
    if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
        acknowledgeMessage = in.readOptionalString();
        int size = in.readVInt();
        Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            String feature = in.readString();
            int nMessages = in.readVInt();
            String[] messages = new String[nMessages];
            for (int j = 0; j < nMessages; j++) {
                messages[j] = in.readString();
            }
            acknowledgeMessages.put(feature, messages);
        }
        this.acknowledgeMessages = acknowledgeMessages;
    } else {
        this.acknowledgeMessages = Collections.emptyMap();
    }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        out.writeEnum(status);
        out.writeOptionalString(acknowledgeMessage);
        out.writeVInt(acknowledgeMessages.size());
    }
}

```

```

    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
} else {
    if (status == Status.UPGRADED_TO_TRIAL) {
        out.writeEnum(Pre63Status.UPGRADED_TO_TRIAL);
    } else if (status == Status.TRIAL_ALREADY_ACTIVATED) {
        out.writeEnum(Pre63Status.TRIAL_ALREADY_ACTIVATED);
    } else {
        throw new IllegalArgumentException("Starting trial on node with version [" + Version.CURRENT + "]
requires " +
            "acknowledgement parameter.");
    }
}
}
}

```

```

Map<String, String[]> getAcknowledgementMessages() {
    return acknowledgeMessages;
}

```

```

String getAcknowledgementMessage() {
    return acknowledgeMessage;
}
}

```

```

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 */

```

```

package org.elasticsearch.license;

```

```

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.io.stream.Writable;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.xpack.core.XPackBuild;

```

```

import java.io.IOException;
import java.util.ArrayList;
import java.util.Collections;

```

```

import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.stream.Collectors;

public class XPackInfoResponse extends ActionResponse {

    @Nullable private BuildInfo buildInfo;
    @Nullable private LicenseInfo licenseInfo;
    @Nullable private FeatureSetsInfo featureSetsInfo;

    public XPackInfoResponse() {}

    public XPackInfoResponse(@Nullable BuildInfo buildInfo, @Nullable LicenseInfo licenseInfo, @Nullable
FeatureSetsInfo featureSetsInfo) {
        this.buildInfo = buildInfo;
        this.licenseInfo = licenseInfo;
        this.featureSetsInfo = featureSetsInfo;
    }

    /**
     * @return The build info (incl. build hash and timestamp)
     */
    public BuildInfo getBuildInfo() {
        return buildInfo;
    }

    /**
     * @return The current license info (incl. UID, type/mode. status and expiry date). May return {@code null}
when no
     *     license is currently installed.
     */
    public LicenseInfo getLicenseInfo() {
        return licenseInfo;
    }

    /**
     * @return The current status of the feature sets in X-Pack. Feature sets describe the features available/enabled in
X-Pack.
     */
    public FeatureSetsInfo getFeatureSetsInfo() {
        return featureSetsInfo;
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {

```

```

    super.writeTo(out);
    out.writeOptionalWriteable(buildInfo);
    out.writeOptionalWriteable(licenseInfo);
    out.writeOptionalWriteable(featureSetsInfo);
}

@Override
public void readFrom(StreamInput in) throws IOException {
    this.buildInfo = in.readOptionalWriteable(BuildInfo::new);
    this.licenseInfo = in.readOptionalWriteable(LicenseInfo::new);
    this.featureSetsInfo = in.readOptionalWriteable(FeatureSetsInfo::new);
}

public static class LicenseInfo implements ToXContentObject, Writeable {

    private final String uid;
    private final String type;
    private final String mode;
    private final long expiryDate;
    private final License.Status status;

    public LicenseInfo(License license) {
        this(license.uid(), license.type(), license.operationMode().name().toLowerCase(Locale.ROOT),
            license.status(), license.expiryDate());
    }

    public LicenseInfo(StreamInput in) throws IOException {
        this(in.readString(), in.readString(), in.readString(), License.Status.readFrom(in), in.readLong());
    }

    public LicenseInfo(String uid, String type, String mode, License.Status status, long expiryDate) {
        this.uid = uid;
        this.type = type;
        this.mode = mode;
        this.status = status;
        this.expiryDate = expiryDate;
    }

    public String getUid() {
        return uid;
    }

    public String getType() {
        return type;
    }

    public String getMode() {
        return mode;
    }
}

```

```

    }

    public long getExpiryDate() {
        return expiryDate;
    }

    public License.Status getStatus() {
        return status;
    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        builder.startObject()
            .field("uid", uid)
            .field("type", type)
            .field("mode", mode)
            .field("status", status.label());
        if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
            builder.timeField("expiry_date_in_millis", "expiry_date", expiryDate);
        }
        return builder.endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(uid);
        out.writeString(type);
        out.writeString(mode);
        status.writeTo(out);
        out.writeLong(expiryDate);
    }
}

public static class BuildInfo implements ToXContentObject, Writable {

    private final String hash;
    private final String timestamp;

    public BuildInfo(XPackBuild build) {
        this(build.shortHash(), build.date());
    }

    public BuildInfo(StreamInput input) throws IOException {
        this(input.readString(), input.readString());
    }

    public BuildInfo(String hash, String timestamp) {
        this.hash = hash;
        this.timestamp = timestamp;
    }
}

```

```

    }

    public String getHash() {
        return hash;
    }

    public String getTimestamp() {
        return timestamp;
    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        return builder.startObject()
            .field("hash", hash)
            .field("date", timestamp)
            .endObject();
    }

    public void writeTo(StreamOutput output) throws IOException {
        output.writeString(hash);
        output.writeString(timestamp);
    }
}

public static class FeatureSetsInfo implements ToXContentObject, Writeable {

    private final Map<String, FeatureSet> featureSets;

    public FeatureSetsInfo(StreamInput in) throws IOException {
        int size = in.readVInt();
        Map<String, FeatureSet> featureSets = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            FeatureSet featureSet = new FeatureSet(in);
            featureSets.put(featureSet.name, featureSet);
        }
        this.featureSets = Collections.unmodifiableMap(featureSets);
    }

    public FeatureSetsInfo(Set<FeatureSet> featureSets) {
        Map<String, FeatureSet> map = new HashMap<>(featureSets.size());
        for (FeatureSet featureSet : featureSets) {
            map.put(featureSet.name, featureSet);
        }
        this.featureSets = Collections.unmodifiableMap(map);
    }

    public Map<String, FeatureSet> getFeatureSets() {
        return featureSets;
    }
}

```

```

    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        builder.startObject();
        List<String> names = new
ArrayList<>(this.featureSets.keySet()).stream().sorted().collect(Collectors.toList());
        for (String name : names) {
            builder.field(name, featureSets.get(name), params);
        }
        return builder.endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeVInt(featureSets.size());
        for (FeatureSet featureSet : featureSets.values()) {
            featureSet.writeTo(out);
        }
    }

    public static class FeatureSet implements ToXContentObject, Writeable {

        private final String name;
        @Nullable private final String description;
        private final boolean available;
        private final boolean enabled;
        @Nullable private final Map<String, Object> nativeCodeInfo;

        public FeatureSet(StreamInput in) throws IOException {
            this(in.readString(), in.readOptionalString(), in.readBoolean(), in.readBoolean(),
                in.getVersion().onOrAfter(Version.V_5_4_0) ? in.readMap() : null);
        }

        public FeatureSet(String name, @Nullable String description, boolean available, boolean enabled,
            @Nullable Map<String, Object> nativeCodeInfo) {
            this.name = name;
            this.description = description;
            this.available = available;
            this.enabled = enabled;
            this.nativeCodeInfo = nativeCodeInfo;
        }

        public String name() {
            return name;
        }

        @Nullable
        public String description() {

```



```

        return description;
    }

    public boolean available() {
        return available;
    }

    public boolean enabled() {
        return enabled;
    }

    @Nullable
    public Map<String, Object> nativeCodeInfo() {
        return nativeCodeInfo;
    }

    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        builder.startObject();
        if (description != null) {
            builder.field("description", description);
        }
        builder.field("available", available);
        builder.field("enabled", enabled);
        if (nativeCodeInfo != null) {
            builder.field("native_code_info", nativeCodeInfo);
        }
        return builder.endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(name);
        out.writeOptionalString(description);
        out.writeBoolean(available);
        out.writeBoolean(enabled);
        if (out.getVersion().onOrAfter(Version.V_5_4_0)) {
            out.writeMap(nativeCodeInfo);
        }
    }
}

/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartBasicAction extends Action<PostStartBasicRequest, PostStartBasicResponse,
PostStartBasicRequestBuilder> {

    public static final PostStartBasicAction INSTANCE = new PostStartBasicAction();
    public static final String NAME = "cluster:admin/xpack/license/start_basic";

    private PostStartBasicAction() {
        super(NAME);
    }

    @Override
    public PostStartBasicRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartBasicRequestBuilder(client, this);
    }

    @Override
    public PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetBasicStatusRequestBuilder extends ActionRequestBuilder<GetBasicStatusRequest,
GetBasicStatusResponse,
    GetBasicStatusRequestBuilder> {

    GetBasicStatusRequestBuilder(ElasticsearchClient client, GetBasicStatusAction action) {
        super(client, action, new GetBasicStatusRequest());
    }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartTrialRequest extends MasterNodeRequest<PostStartTrialRequest> {

    private boolean acknowledge = false;
    private String type;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartTrialRequest setType(String type) {
        this.type = type;
        return this;
    }

    public String getType() {
        return type;
    }

    public PostStartTrialRequest acknowledge(boolean acknowledge) {
        this.acknowledge = acknowledge;
        return this;
    }

    public boolean isAcknowledged() {
        return acknowledge;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
            type = in.readString();
            acknowledge = in.readBoolean();
        } else {
            type = "trial";
            acknowledge = true;
        }
    }
}

```

```

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        super.writeTo(out);
        out.writeString(type);
        out.writeBoolean(acknowledge);
    } else {
        if ("trial".equals(type) == false) {
            throw new IllegalArgumentException("All nodes in cluster must be version [" + version
                + "] or newer to start trial with a different type than 'trial'. Attempting to write to " +
                "a node with version [" + out.getVersion() + "] with trial type [" + type + "].");
        } else if (acknowledge == false) {
            throw new IllegalArgumentException("Request must be acknowledged to send to a node with a version " +
                "prior to [" + version + "]. Attempting to send request to node with version [" + out.getVersion() + "] "
                +
                "without acknowledgement.");
        } else {
            super.writeTo(out);
        }
    }
}
}
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetTrialStatusAction extends TransportMasterNodeReadAction<GetTrialStatusRequest,
    GetTrialStatusResponse> {

    @Inject

```

```

public TransportGetTrialStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, GetTrialStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
        indexNameExpressionResolver, GetTrialStatusRequest::new);
}

@Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected GetTrialStatusResponse newResponse() {
    return new GetTrialStatusResponse();
}

@Override
protected void masterOperation(GetTrialStatusRequest request, ClusterState state,
        ActionListener<GetTrialStatusResponse> listener) throws Exception {
    LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
    listener.onResponse(new GetTrialStatusResponse(licensesMetaData == null ||
licensesMetaData.isEligibleForTrial()));
}

@Override
protected ClusterBlockException checkBlock(GetTrialStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.AckedClusterStateUpdateTask;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.metadata.MetaData;

```

```

import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.AbstractLifecycleComponent;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.env.Environment;
import org.elasticsearch.gateway.GatewayService;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.time.Clock;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.concurrent.atomic.AtomicReference;

/**
 * Service responsible for managing { @link LicensesMetaData }.
 * <p>
 * On the master node, the service handles updating the cluster state when a new license is registered.
 * It also listens on all nodes for cluster state updates, and updates { @link XPackLicenseState } when
 * the license changes are detected in the cluster state.
 */
public class LicenseService extends AbstractLifecycleComponent implements ClusterStateListener,
SchedulerEngine.Listener {

    public static final Setting<String> SELF_GENERATED_LICENSE_TYPE = new
Setting<>("xpack.license.self_generated.type",
    (s) -> "basic", (s) -> {
        if (SelfGeneratedLicense.validSelfGeneratedType(s)) {
            return s;
        } else {
            throw new IllegalArgumentException("Illegal self generated license type [" + s + "]. Must be trial or basic.");
        }
    }

```

```

    }, Setting.Property.NodeScope);

    // pkg private for tests
    static final TimeValue NON_BASIC_SELF_GENERATED_LICENSE_DURATION =
    TimeValue.timeValueHours(30 * 24);

    static final Set<String> VALID_TRIAL_TYPES = new HashSet<>(Arrays.asList("trial", "platinum", "gold"));

    /**
     * Duration of grace period after a license has expired
     */
    static final TimeValue GRACE_PERIOD_DURATION = days(7);

    public static final long BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS =
    Long.MAX_VALUE - days(365).millis();

    private final ClusterService clusterService;

    /**
     * The xpack feature state to update when license changes are made.
     */
    private final XPackLicenseState licenseState;

    /**
     * Currently active license
     */
    private final AtomicReference<License> currentLicense = new AtomicReference<>();
    private SchedulerEngine scheduler;
    private final Clock clock;

    /**
     * File watcher for operation mode changes
     */
    private final OperationModeFileWatcher operationModeFileWatcher;

    /**
     * Callbacks to notify relative to license expiry
     */
    private List<ExpirationCallback> expirationCallbacks = new ArrayList<>();

    /**
     * Max number of nodes licensed by generated trial license
     */
    static final int SELF_GENERATED_LICENSE_MAX_NODES = 1000;

    public static final String LICENSE_JOB = "licenseJob";

    private static final FormatDateTimeFormatter DATE_FORMATTER = Joda.forPattern("EEEE, MMMMM dd,

```

```
yyyy", Locale.ROOT);
```

```
private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.  
To acknowledge the license, " +  
    "please read the following messages and update the license again, this time with the \"acknowledge=true\"  
parameter:";
```

```
public LicenseService(Settings settings, ClusterService clusterService, Clock clock, Environment env,  
    ResourceWatcherService resourceWatcherService, XPackLicenseState licenseState) {  
    super(settings);  
    this.clusterService = clusterService;  
    this.clock = clock;  
    this.scheduler = new SchedulerEngine(clock);  
    this.licenseState = licenseState;  
    this.operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService,  
        XPackPlugin.resolveConfigFile(env, "license_mode"), logger,  
        () -> updateLicenseState(getLicensesMetaData()));  
    this.scheduler.register(this);  
    populateExpirationCallbacks();  
}
```

```
private void logExpirationWarning(long expirationMillis, boolean expired) {  
    String expiredMsg = expired ? "expired" : "will expire";  
    String general = LoggerMessageFormat.format(null, "License [{}] on [{}].\n" +  
        "# If you have a new license, please update it. Otherwise, please reach out to\n" +  
        "# your support contact.\n" +  
        "# ", expiredMsg, DATE_FORMATTER.printer().print(expirationMillis));  
    if (expired) {  
        general = general.toUpperCase(Locale.ROOT);  
    }  
    StringBuilder builder = new StringBuilder(general);  
    builder.append(System.lineSeparator());  
    if (expired) {  
        builder.append("# COMMERCIAL PLUGINS OPERATING WITH REDUCED FUNCTIONALITY");  
    } else {  
        builder.append("# Commercial plugins operate with reduced functionality on license expiration:");  
    }  
    XPackLicenseState.EXPIRATION_MESSAGES.forEach((feature, messages) -> {  
        if (messages.length > 0) {  
            builder.append(System.lineSeparator());  
            builder.append("# - ");  
            builder.append(feature);  
            for (String message : messages) {  
                builder.append(System.lineSeparator());  
                builder.append("# - ");  
                builder.append(message);  
            }  
        }  
    }  
}
```



```

});
logger.warn("{} ", builder);
}

private void populateExpirationCallbacks() {
    expirationCallbacks.add(new ExpirationCallback.Pre(days(7), days(25), days(1)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Pre(days(0), days(7), TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Post(days(0), null, TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            // logged when grace period begins
            logExpirationWarning(license.expiryDate(), true);
        }
    });
}

/**
 * Registers new license in the cluster
 * Master only operation. Installs a new license on the master provided it is VALID
 */
public void registerLicense(final PutLicenseRequest request, final ActionListener<PutLicenseResponse> listener)
{
    final License newLicense = request.license();
    final long now = clock.millis();
    if (!LicenseVerifier.verifyLicense(newLicense) || newLicense.issueDate() > now || newLicense.startDate() >
now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.INVALID));
    } else if (newLicense.type().equals("basic")) {
        listener.onFailure(new IllegalArgumentException("Registering basic licenses is not allowed."));
    } else if (newLicense.expiryDate() < now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.EXPIRED));
    } else {
        if (!request.acknowledged()) {
            // TODO: ack messages should be generated on the master, since another node's cluster state may be
behind...
            final License currentLicense = getLicense();
            if (currentLicense != null) {
                Map<String, String[]> acknowledgeMessages = getAckMessages(newLicense, currentLicense);

```

```

        if (acknowledgeMessages.isEmpty() == false) {
            // needs acknowledgement
            listener.onResponse(new PutLicenseResponse(false, LicensesStatus.VALID,
ACKNOWLEDGEMENT_HEADER,
                acknowledgeMessages));
            return;
        }
    }
}

if (newLicense.isProductionLicense()
    && XPackSettings.SECURITY_ENABLED.get(settings)
    && XPackSettings.TRANSPORT_SSL_ENABLED.get(settings) == false
    && isProductionMode(settings, clusterService.localNode())) {
    // security is on but TLS is not configured we gonna fail the entire request and throw an exception
    throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
        "] license unless TLS is configured or security is disabled");
    // TODO we should really validate that all nodes have xpack installed and are consistently configured but
this
    // should happen on a different level and not in this code
} else {
    clusterService.submitStateUpdateTask("register license [" + newLicense.uid() + "]", new
        AckedClusterStateUpdateTask<PutLicenseResponse>(request, listener) {
            @Override
            protected PutLicenseResponse newResponse(boolean acknowledged) {
                return new PutLicenseResponse(acknowledged, LicensesStatus.VALID);
            }

            @Override
            public ClusterState execute(ClusterState currentState) throws Exception {
                XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
                Metadata currentMetadata = currentState.metadata();
                LicensesMetadata licensesMetadata = currentMetadata.custom(LicensesMetadata.TYPE);
                Version trialVersion = null;
                if (licensesMetadata != null) {
                    trialVersion = licensesMetadata.getMostRecentTrialVersion();
                }
                Metadata.Builder mdBuilder = Metadata.builder(currentMetadata);
                mdBuilder.putCustom(LicensesMetadata.TYPE, new LicensesMetadata(newLicense,
trialVersion));
                return ClusterState.builder(currentState).metadata(mdBuilder).build();
            }
        });
    }
}

public static Map<String, String[]> getAckMessages(License newLicense, License currentLicense) {

```

```

Map<String, String[]> acknowledgeMessages = new HashMap<>();
if (!License.isAutoGeneratedLicense(currentLicense.signature()) // current license is not auto-generated
    && currentLicense.issueDate() > newLicense.issueDate()) { // and has a later issue date
    acknowledgeMessages.put("license", new String[]{
        "The new license is older than the currently installed license. " +
        "Are you sure you want to override the current license?" });
    }
XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.forEach((feature, ackMessages) -> {
    String[] messages = ackMessages.apply(currentLicense.operationMode(), newLicense.operationMode());
    if (messages.length > 0) {
        acknowledgeMessages.put(feature, messages);
    }
});
return acknowledgeMessages;
}

private static TimeValue days(int days) {
    return TimeValue.timeValueHours(days * 24);
}

@Override
public void triggered(SchedulerEngine.Event event) {
    final LicensesMetaData licensesMetaData = getLicensesMetaData();
    if (licensesMetaData != null) {
        final License license = licensesMetaData.getLicense();
        if (event.getJobName().equals(LICENSE_JOB)) {
            updateLicenseState(license, licensesMetaData.getMostRecentTrialVersion());
        } else if (event.getJobName().startsWith(ExpirationCallback.EXPIRATION_JOB_PREFIX)) {
            expirationCallbacks.stream()
                .filter(expirationCallback -> expirationCallback.getId().equals(event.getJobName()))
                .forEach(expirationCallback -> expirationCallback.on(license));
        }
    }
}

/**
 * Remove license from the cluster state metadata
 */
public void removeLicense(final DeleteLicenseRequest request, final
ActionListener<ClusterStateUpdateResponse> listener) {
    clusterService.submitStateUpdateTask("delete license",
        new AckedClusterStateUpdateTask<ClusterStateUpdateResponse>(request, listener) {
        @Override
        protected ClusterStateUpdateResponse newResponse(boolean acknowledged) {
            return new ClusterStateUpdateResponse(acknowledged);
        }
    }
}

```

```

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    Metadata metaData = currentState.metaData();
    final LicensesMetadata currentLicenses = metaData.custom(LicensesMetadata.TYPE);
    if (currentLicenses.getLicense() != LicensesMetadata.LICENSE_TOMBSTONE) {
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        LicensesMetadata newMetadata = new
LicensesMetadata(LicensesMetadata.LICENSE_TOMBSTONE,
                    currentLicenses.getMostRecentTrialVersion());
        mdBuilder.putCustom(LicensesMetadata.TYPE, newMetadata);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}

public License getLicense() {
    final License license = getLicense(clusterService.state().metaData());
    return license == LicensesMetadata.LICENSE_TOMBSTONE ? null : license;
}

private LicensesMetadata getLicensesMetadata() {
    return this.clusterService.state().metaData().custom(LicensesMetadata.TYPE);
}

void startTrialLicense(PostStartTrialRequest request, final ActionListener<PostStartTrialResponse> listener) {
    if (VALID_TRIAL_TYPES.contains(request.getType()) == false) {
        throw new IllegalArgumentException("Cannot start trial of type [" + request.getType() + "]. Valid trial types
are "
            + VALID_TRIAL_TYPES + ".");
    }
    StartTrialClusterTask task = new StartTrialClusterTask(logger, clusterService.getClusterName().value(), clock,
request, listener);
    clusterService.submitStateUpdateTask("started trial license", task);
}

void startBasicLicense(PostStartBasicRequest request, final ActionListener<PostStartBasicResponse> listener) {
    StartBasicClusterTask task = new StartBasicClusterTask(logger, clusterService.getClusterName().value(),
clock, request, listener);
    clusterService.submitStateUpdateTask("start basic license", task);
}

/**
 * Master-only operation to generate a one-time global self generated license.
 * The self generated license is only generated and stored if the current cluster state metadata
 * has no existing license. If the cluster currently has a basic license that has an expiration date,

```

```

* a new basic license with no expiration date is generated.
*/
private void registerOrUpdateSelfGeneratedLicense() {
    clusterService.submitStateUpdateTask("maybe generate license for cluster",
        new StartupSelfGeneratedLicenseTask(settings, clock, clusterService));
}

@Override
protected void doStart() throws ElasticsearchException {
    clusterService.addListener(this);
    scheduler.start(Collections.emptyList());
    logger.debug("initializing license state");
    if (clusterService.lifecycleState() == Lifecycle.State.STARTED) {
        final ClusterState clusterState = clusterService.state();
        if (clusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK) == false
&&
            clusterState.nodes().getMasterNode() != null &&
XPackPlugin.isReadyForXPackCustomMetadata(clusterState)) {
            final LicensesMetaData currentMetaData = clusterState.metaData().custom(LicensesMetaData.TYPE);
            boolean noLicense = currentMetaData == null || currentMetaData.getLicense() == null;
            if (clusterState.getNodes().isLocalNodeElectedMaster() &&
                (noLicense || LicenseUtils.licenseNeedsExtended(currentMetaData.getLicense()))) {
                // triggers a cluster changed event eventually notifying the current licensee
                registerOrUpdateSelfGeneratedLicense();
            }
        }
    }
}

@Override
protected void doStop() throws ElasticsearchException {
    clusterService.removeListener(this);
    scheduler.stop();
    // clear current license
    currentLicense.set(null);
}

@Override
protected void doClose() throws ElasticsearchException {
}

/**
 * When there is no global block on { @link
org.elasticsearch.gateway.GatewayService#STATE_NOT_RECOVERED_BLOCK}
 * notify licensees and issue auto-generated license if no license has been installed/issued yet.
 */
@Override
public void clusterChanged(ClusterChangedEvent event) {

```

```

final ClusterState previousClusterState = event.previousState();
final ClusterState currentClusterState = event.state();
if (!currentClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)) {
    if (XPackPlugin.isReadyForXPackCustomMetadata(currentClusterState) == false) {
        logger.debug("cannot add license to cluster as the following nodes might not understand the license
metadata: {}",
            () -> XPackPlugin.nodesNotReadyForXPackCustomMetadata(currentClusterState));
        return;
    }

    final LicensesMetaData prevLicensesMetaData =
previousClusterState.getMetaData().custom(LicensesMetaData.TYPE);
    final LicensesMetaData currentLicensesMetaData =
currentClusterState.getMetaData().custom(LicensesMetaData.TYPE);
    if (logger.isDebugEnabled()) {
        logger.debug("previous [{}]", prevLicensesMetaData);
        logger.debug("current [{}]", currentLicensesMetaData);
    }
    // notify all interested plugins
    if (previousClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)
        || prevLicensesMetaData == null) {
        if (currentLicensesMetaData != null) {
            onUpdate(currentLicensesMetaData);
        }
    } else if (!prevLicensesMetaData.equals(currentLicensesMetaData)) {
        onUpdate(currentLicensesMetaData);
    }

    License currentLicense = null;
    boolean noLicenseInPrevMetadata = prevLicensesMetaData == null || prevLicensesMetaData.getLicense()
== null;
    if (noLicenseInPrevMetadata == false) {
        currentLicense = prevLicensesMetaData.getLicense();
    }
    boolean noLicenseInCurrentMetadata = (currentLicensesMetaData == null ||
currentLicensesMetaData.getLicense() == null);
    if (noLicenseInCurrentMetadata == false) {
        currentLicense = currentLicensesMetaData.getLicense();
    }

    boolean noLicense = noLicenseInPrevMetadata && noLicenseInCurrentMetadata;
    // auto-generate license if no licenses ever existed or if the current license is basic and
    // needs extended. this will trigger a subsequent cluster changed event
    if (currentClusterState.getNodes().isLocalNodeElectedMaster()
        && (noLicense || LicenseUtils.licenseNeedsExtended(currentLicense))) {
        registerOrUpdateSelfGeneratedLicense();
    }
} else if (logger.isDebugEnabled()) {

```

```

        logger.debug("skipped license notifications reason: [{}]",
GatewayService.STATE_NOT_RECOVERED_BLOCK);
    }
}

private void updateLicenseState(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        updateLicenseState(getLicense(licensesMetaData), licensesMetaData.getMostRecentTrialVersion());
    }
}

protected void updateLicenseState(final License license, Version mostRecentTrialVersion) {
    if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
        // implies license has been explicitly deleted
        licenseState.update(License.OperationMode.MISSING, false, mostRecentTrialVersion);
        return;
    }
    if (license != null) {
        long time = clock.millis();
        boolean active;
        if (license.expiryDate() == BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
            active = true;
        } else {
            // We subtract the grace period from the current time to avoid overflowing on an expiration
            // date that is near Long.MAX_VALUE
            active = time >= license.issueDate() && time - GRACE_PERIOD_DURATION.getMillis() <
license.expiryDate();
        }
        licenseState.update(license.operationMode(), active, mostRecentTrialVersion);

        if (active) {
            if (time < license.expiryDate()) {
                logger.debug("license [{}] - valid", license.uid());
            } else {
                logger.warn("license [{}] - grace", license.uid());
            }
        } else {
            logger.warn("license [{}] - expired", license.uid());
        }
    }
}

/**
 * Notifies registered licensees of license state change and/or new active license
 * based on the license in <code>currentLicensesMetaData</code>.
 * Additionally schedules license expiry notifications and event callbacks
 * relative to the current license's expiry
 */

```

```

private void onUpdate(final LicensesMetaData currentLicensesMetaData) {
    final License license = getLicense(currentLicensesMetaData);
    // license can be null if the trial license is yet to be auto-generated
    // in this case, it is a no-op
    if (license != null) {
        final License previousLicense = currentLicense.get();
        if (license.equals(previousLicense) == false) {
            currentLicense.set(license);
            license.setOperationModeFileWatcher(operationModeFileWatcher);
            scheduler.add(new SchedulerEngine.Job(LICENSE_JOB, nextLicenseCheck(license)));
            for (ExpirationCallback expirationCallback : expirationCallbacks) {
                scheduler.add(new SchedulerEngine.Job(expirationCallback.getId(),
                    (startTime, now) ->
                        expirationCallback.nextScheduledTimeForExpiry(license.expiryDate(), startTime, now)));
            }
            if (previousLicense != null) {
                // remove operationModeFileWatcher to gc the old license object
                previousLicense.removeOperationModeFileWatcher();
            }
            logger.info("license [{}] mode [{}] - valid", license.uid(),
                license.operationMode().name().toLowerCase(Locale.ROOT));
        }
        updateLicenseState(license, currentLicensesMetaData.getMostRecentTrialVersion());
    }
}

// pkg private for tests
static SchedulerEngine.Schedule nextLicenseCheck(License license) {
    return (startTime, time) -> {
        if (time < license.issueDate()) {
            // when we encounter a license with a future issue date
            // which can happen with autogenerated license,
            // we want to schedule a notification on the license issue date
            // so the license is notified once it is valid
            // see https://github.com/elastic/x-plugins/issues/983
            return license.issueDate();
        } else if (time < license.expiryDate()) {
            return license.expiryDate();
        } else if (time < license.expiryDate() + GRACE_PERIOD_DURATION.getMillis()) {
            return license.expiryDate() + GRACE_PERIOD_DURATION.getMillis();
        }
        return -1; // license is expired, no need to check again
    };
}

public static License getLicense(final MetaData metaData) {
    final LicensesMetaData licensesMetaData = metaData.custom(LicensesMetaData.TYPE);
    return getLicense(licensesMetaData);
}

```



```

}

static License getLicense(final LicensesMetaData metaData) {
    if (metaData != null) {
        License license = metaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return license;
        } else if (license != null) {
            boolean autoGeneratedLicense = License.isAutoGeneratedLicense(license.signature());
            if ((autoGeneratedLicense && SelfGeneratedLicense.verify(license))
                || (!autoGeneratedLicense && LicenseVerifier.verifyLicense(license))) {
                return license;
            }
        }
    }
    return null;
}

private static boolean isProductionMode(Settings settings, DiscoveryNode localNode) {
    final boolean singleNodeDisco = "single-
node".equals(DiscoveryModule.DISCOVERY_TYPE_SETTING.get(settings));
    return singleNodeDisco == false && isBoundToLoopback(localNode) == false;
}

private static boolean isBoundToLoopback(DiscoveryNode localNode) {
    return localNode.getAddress().address().isLoopbackAddress();
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartTrialAction extends Action<PostStartTrialRequest, PostStartTrialResponse,
PostStartTrialRequestBuilder> {

    public static final PostStartTrialAction INSTANCE = new PostStartTrialAction();
    public static final String NAME = "cluster:admin/xpack/license/start_trial";

    private PostStartTrialAction() {
        super(NAME);
    }
}

```

```

@Override
public PostStartTrialRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new PostStartTrialRequestBuilder(client, this);
}

@Override
public PostStartTrialResponse newResponse() {
    return new PostStartTrialResponse();
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.rest.action.RestBuilderListener;

public class LicensingClient {

    private final ElasticsearchClient client;

    public LicensingClient(ElasticsearchClient client) {
        this.client = client;
    }

    public PutLicenseRequestBuilder preparePutLicense(License license) {
        return new PutLicenseRequestBuilder(client).setLicense(license);
    }

    public void putLicense(PutLicenseRequest request, ActionListener<PutLicenseResponse> listener) {
        client.execute(PutLicenseAction.INSTANCE, request, listener);
    }

    public GetLicenseRequestBuilder prepareGetLicense() {
        return new GetLicenseRequestBuilder(client);
    }

    public void getLicense(GetLicenseRequest request, ActionListener<GetLicenseResponse> listener) {
        client.execute(GetLicenseAction.INSTANCE, request, listener);
    }

    public DeleteLicenseRequestBuilder prepareDeleteLicense() {
        return new DeleteLicenseRequestBuilder(client);
    }
}

```

```

public void deleteLicense(DeleteLicenseRequest request, ActionListener<DeleteLicenseResponse> listener) {
    client.execute(DeleteLicenseAction.INSTANCE, request, listener);
}

public PostStartTrialRequestBuilder preparePostStartTrial() {
    return new PostStartTrialRequestBuilder(client, PostStartTrialAction.INSTANCE);
}

public GetTrialStatusRequestBuilder prepareGetStartTrial() {
    return new GetTrialStatusRequestBuilder(client, GetTrialStatusAction.INSTANCE);
}

public void postStartTrial(PostStartTrialRequest request, ActionListener<PostStartTrialResponse> listener) {
    client.execute(PostStartTrialAction.INSTANCE, request, listener);
}

public void postStartBasic(PostStartBasicRequest request, ActionListener<PostStartBasicResponse> listener) {
    client.execute(PostStartBasicAction.INSTANCE, request, listener);
}

public PostStartBasicRequestBuilder preparePostStartBasic() {
    return new PostStartBasicRequestBuilder(client, PostStartBasicAction.INSTANCE);
}

public GetBasicStatusRequestBuilder prepareGetStartBasic() {
    return new GetBasicStatusRequestBuilder(client, GetBasicStatusAction.INSTANCE);
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

```

```

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetBasicStatus extends XPackRestHandler {

    RestGetBasicStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/basic_status", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        return channel -> client.licensing().prepareGetStartBasic().execute(
            new RestBuilderListener<GetBasicStatusResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetBasicStatusResponse response, XContentBuilder builder)
                throws Exception {
                    builder.startObject();
                    builder.field("eligible_to_start_basic", response.isEligibleToStartBasic());
                    builder.endObject();
                    return new BytesRestResponse(RestStatus.OK, builder);
                }
            });
    }

    @Override
    public String getName() {
        return "xpack_basic_status_action";
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseRequest extends AcknowledgedRequest<DeleteLicenseRequest> {

```

```

public DeleteLicenseRequest() {
}

@Override
public ActionRequestValidationException validate() {
    return null;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.UUID;

public class StartupSelfGeneratedLicenseTask extends ClusterStateUpdateTask {

    /**
     * Max number of nodes licensed by generated trial license
     */
    private int selfGeneratedLicenseMaxNodes = 1000;

```

```

private final Settings settings;
private final Clock clock;
private final ClusterService clusterService;
private final Logger logger;

public StartupSelfGeneratedLicenseTask(Settings settings, Clock clock, ClusterService clusterService) {
    this.settings = settings;
    this.clock = clock;
    this.clusterService = clusterService;
    this.logger = Loggers.getLogger(getClass(), settings);
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData licensesMetaData = newState.metaData().custom(LicensesMetaData.TYPE);
    if (logger.isDebugEnabled()) {
        logger.debug("registered self generated license: {}", licensesMetaData);
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadadata(currentState);
    final MetaData metaData = currentState.metaData();
    final LicensesMetaData currentLicensesMetaData = metaData.custom(LicensesMetaData.TYPE);
    // do not generate a license if any license is present
    if (currentLicensesMetaData == null) {
        String type = LicenseService.SELF_GENERATED_LICENSE_TYPE.get(settings);
        if (SelfGeneratedLicense.validSelfGeneratedType(type) == false) {
            throw new IllegalArgumentException("Illegal self generated license type [" + type +
                "]. Must be trial or basic.");
        }

        return updateWithLicense(currentState, type);
    } else if (LicenseUtils.licenseNeedsExtended(currentLicensesMetaData.getLicense())) {
        return extendBasic(currentState, currentLicensesMetaData);
    } else {
        return currentState;
    }
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error((Supplier<?>) () -> new ParameterizedMessage("unexpected failure during [{}]", source), e);
}

private ClusterState extendBasic(ClusterState currentState, LicensesMetaData currentLicenseMetadadata) {
    License license = currentLicenseMetadadata.getLicense();
}

```

```

    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    LicensesMetadata newLicenseMetadata = createBasicLicenseFromExistingLicense(currentLicenseMetadata);
    mdBuilder.putCustom(LicensesMetadata.TYPE, newLicenseMetadata);
    logger.info("Existing basic license has an expiration. Basic licenses no longer expire." +
        "Regenerating license.\n\nOld license:\n { }\n\n New license:\n{ }", license,
newLicenseMetadata.getLicense());
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

private LicensesMetadata createBasicLicenseFromExistingLicense(LicensesMetadata currentLicenseMetadata) {
    License currentLicense = currentLicenseMetadata.getLicense();
    License.Builder specBuilder = License.builder()
        .uid(currentLicense.uid())
        .issuedTo(currentLicense.issuedTo())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(currentLicense.issueDate())
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
    Version trialVersion = currentLicenseMetadata.getMostRecentTrialVersion();
    return new LicensesMetadata(selfGeneratedLicense, trialVersion);
}

private ClusterState updateWithLicense(ClusterState currentState, String type) {
    long issueDate = clock.millis();
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    long expiryDate;
    if ("basic".equals(type)) {
        expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
    }
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo(clusterService.getClusterName().value())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(issueDate)
        .type(type)
        .expiryDate(expiryDate);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
    LicensesMetadata licensesMetadata;
    if ("trial".equals(type)) {
        licensesMetadata = new LicensesMetadata(selfGeneratedLicense, Version.CURRENT);
    } else {
        licensesMetadata = new LicensesMetadata(selfGeneratedLicense, null);
    }
    mdBuilder.putCustom(LicensesMetadata.TYPE, licensesMetadata);
}

```

```

        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.license.PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT;

class PostStartBasicResponse extends AcknowledgedResponse {

    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeMessage;

    enum Status {
        GENERATED_BASIC(true, null, RestStatus.OK),
        ALREADY_USING_BASIC(false, "Operation failed: Current license is basic.", RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

        private final boolean isBasicStarted;
        private final String errorMessage;
        private final RestStatus restStatus;

        Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
            this.isBasicStarted = isBasicStarted;
            this.errorMessage = errorMessage;
            this.restStatus = restStatus;
        }
    }

    boolean isBasicStarted() {
        return isBasicStarted;
    }

    String getErrorMessage() {

```



```

        return errorMessage;
    }

    RestStatus getRestStatus() {
        return restStatus;
    }
}

private Status status;

PostStartBasicResponse() {
}

PostStartBasicResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartBasicResponse(Status status, Map<String, String[]> acknowledgeMessages, String
acknowledgeMessage) {
    super(status != NEED_ACKNOWLEDGEMENT);
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
    status = in.readEnum(Status.class);
    acknowledgeMessage = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

```

```

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
    out.writeEnum(status);
    out.writeOptionalString(acknowledgeMessage);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    if (status.isBasicStarted()) {
        builder.field("basic_was_started", true);
    } else {
        builder.field("basic_was_started", false);
        builder.field("error_message", status.getErrorMessage());
    }
    if (acknowledgeMessages.isEmpty() == false) {
        builder.startObject("acknowledge");
        builder.field("message", acknowledgeMessage);
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            builder.startArray(entry.getKey());
            for (String message : entry.getValue()) {
                builder.value(message);
            }
            builder.endArray();
        }
        builder.endObject();
    }
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;

```

```

import org.joda.time.MutableDateTime;
import org.joda.time.format.DateTimeFormatter;
import org.joda.time.format.ISODateTimeFormat;

public class DateUtils {

    private static final FormatDateTimeFormatter formatDateOnlyFormatter = Joda.forPattern("yyyy-MM-dd");

    private static final DateTimeFormatter dateOnlyFormatter = formatDateOnlyFormatter.parser().withZoneUTC();

    private static final DateTimeFormatter dateTimeFormatter = ISODateTimeFormat.dateTime().withZoneUTC();

    public static long endOfDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
            dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
            return dateTime.getMillis();
        }
    }

    public static long beginningOfDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            return dateOnlyFormatter.parseDateTime(date).getMillis();
        }
    }

}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseRequestBuilder extends AcknowledgedRequestBuilder<DeleteLicenseRequest,
DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

```

```

public DeleteLicenseRequestBuilder(ElasticsearchClient client) {
    this(client, DeleteLicenseAction.INSTANCE);
}

/**
 * Creates new get licenses request builder
 *
 * @param client elasticsearch client
 */
public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
    super(client, action, new DeleteLicenseRequest());
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

public enum LicensesStatus {
    VALID((byte) 0),
    INVALID((byte) 1),
    EXPIRED((byte) 2);

    private final byte id;

    LicensesStatus(byte id) {
        this.id = id;
    }

    public int id() {
        return id;
    }

    public static LicensesStatus fromId(int id) {
        if (id == 0) {
            return VALID;
        } else if (id == 1) {
            return INVALID;
        } else if (id == 2) {
            return EXPIRED;
        } else {
            throw new IllegalStateException("no valid LicensesStatus for id=" + id);
        }
    }
}
}

```

```

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 */

/**
 * Licensing for xpack.
 *
 * A {@link org.elasticsearch.license.License} is a signed set of json properties that determine what features
 * are available in a running cluster. Licenses are registered through a
 * {@link org.elasticsearch.license.PutLicenseRequest}. This action is handled by the master node, which places
 * the signed license into the cluster state. Each node listens for cluster state updates via the
 * {@link org.elasticsearch.license.LicenseService}, and updates its local copy of the license when it detects
 * changes in the cluster state.
 *
 * The logic for which features are available given the current license is handled by
 * {@link org.elasticsearch.license.XPackLicenseState}, which is updated by the
 * {@link org.elasticsearch.license.LicenseService} when the license changes.
 */
package org.elasticsearch.license;

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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPutLicenseAction extends TransportMasterNodeAction<PutLicenseRequest,
PutLicenseResponse> {

    private final LicenseService licenseService;

    @Inject

```

```

public TransportPutLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, PutLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
        PutLicenseRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@Override
protected PutLicenseResponse newResponse() {
    return new PutLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(PutLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final PutLicenseRequest request, ClusterState state, final
ActionListener<PutLicenseResponse>
    listener) throws ElasticsearchException {
    licenseService.registerLicense(request, listener);
}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartBasicRequestBuilder extends ActionRequestBuilder<PostStartBasicRequest,
    PostStartBasicResponse, PostStartBasicRequestBuilder> {

    PostStartBasicRequestBuilder(ElasticsearchClient client, PostStartBasicAction action) {
        super(client, action, new PostStartBasicRequest());
    }
}

```

```

    }

    public PostStartBasicRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetTrialStatusResponse extends ActionResponse {

    private boolean eligibleToStartTrial;

    GetTrialStatusResponse() {
    }

    GetTrialStatusResponse(boolean eligibleToStartTrial) {
        this.eligibleToStartTrial = eligibleToStartTrial;
    }

    boolean isEligibleToStartTrial() {
        return eligibleToStartTrial;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        eligibleToStartTrial = in.readBoolean();
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        out.writeBoolean(eligibleToStartTrial);
    }
}
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```

```

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*/
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicBoolean;
import java.util.concurrent.atomic.AtomicReference;

public class StartTrialClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This API initiates a free 30-day trial for all
    platinum features. " +
        "By starting this trial, you agree that it is subject to the terms and conditions at" +
        " https://www.elastic.co/legal/trial_license/. To begin your free trial, call /start_trial again and specify " +
        "the \"acknowledge=true\" parameter.";

    private static final Map<String, String[]> ACK_MESSAGES = Collections.singletonMap("security",
        new String[] { "With a trial license, X-Pack security features are available, but are not enabled by default." });

    private final Logger logger;
    private final String clusterName;
    private final PostStartTrialRequest request;
    private final ActionListener<PostStartTrialResponse> listener;
    private final Clock clock;

    StartTrialClusterTask(Logger logger, String clusterName, Clock clock, PostStartTrialRequest request,
        ActionListener<PostStartTrialResponse> listener) {
        this.logger = logger;
        this.clusterName = clusterName;
        this.request = request;
        this.listener = listener;
        this.clock = clock;
    }
}

```



```

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
    logger.debug("started self generated trial license: {}", oldLicensesMetaData);

    if (request.isAcknowledged() == false) {
        listener.onResponse(new
PostStartTrialResponse(PostStartTrialResponse.Status.NEED_ACKNOWLEDGEMENT,
                        ACK_MESSAGES, ACKNOWLEDGEMENT_HEADER));
    } else if (oldLicensesMetaData == null || oldLicensesMetaData.isEligibleForTrial()) {
        listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.UPGRADED_TO_TRIAL));
    } else {
        listener.onResponse(new
PostStartTrialResponse(PostStartTrialResponse.Status.TRIAL_ALREADY_ACTIVATED));
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData currentLicensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);

    if (request.isAcknowledged() == false) {
        return currentState;
    } else if (currentLicensesMetaData == null || currentLicensesMetaData.isEligibleForTrial()) {
        long issueDate = clock.millis();
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        long expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();

        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type(request.getType())
            .expiryDate(expiryDate);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense,
Version.CURRENT);
        mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}

@Override

```

```

public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
    listener.onFailure(e);
}
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

    private boolean acknowledge = false;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartBasicRequest acknowledge(boolean acknowledge) {
        this.acknowledge = acknowledge;
        return this;
    }

    public boolean isAcknowledged() {
        return acknowledge;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        acknowledge = in.readBoolean();
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        out.writeBoolean(acknowledge);
    }
}

```

```

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetBasicStatusResponse extends ActionResponse {

    private boolean eligibleToStartBasic;

    GetBasicStatusResponse() {
    }

    GetBasicStatusResponse(boolean eligibleToStartBasic) {
        this.eligibleToStartBasic = eligibleToStartBasic;
    }

    boolean isEligibleToStartBasic() {
        return eligibleToStartBasic;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        eligibleToStartBasic = in.readBoolean();
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        out.writeBoolean(eligibleToStartBasic);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.unit.TimeValue;

```

```

import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.util.UUID;

abstract class ExpirationCallback {

    static final String EXPIRATION_JOB_PREFIX = ".license_expiration_job_";

    public enum Orientation {PRE, POST}

    /**
     * Callback that is triggered every <code>frequency</code> when
     * current time is between <code>max</code> and <code>min</code>
     * before license expiry.
     */
    public abstract static class Pre extends ExpirationCallback {

        /**
         * Callback schedule prior to license expiry
         *
         * @param min    latest relative time to execute before license expiry
         * @param max    earliest relative time to execute before license expiry
         * @param frequency interval between execution
         */
        Pre(TimeValue min, TimeValue max, TimeValue frequency) {
            super(Orientation.PRE, min, max, frequency);
        }
    }

    /**
     * Callback that is triggered every <code>frequency</code> when
     * current time is between <code>min</code> and <code>max</code>
     * after license expiry.
     */
    public abstract static class Post extends ExpirationCallback {

        /**
         * Callback schedule after license expiry
         *
         * @param min    earliest relative time to execute after license expiry
         * @param max    latest relative time to execute after license expiry
         * @param frequency interval between execution
         */
        Post(TimeValue min, TimeValue max, TimeValue frequency) {
            super(Orientation.POST, min, max, frequency);
        }
    }
}

```

```

private final String id;
private final Orientation orientation;
private final long min;
private final long max;
private final long frequency;

private ExpirationCallback(Orientation orientation, TimeValue min, TimeValue max, TimeValue frequency) {
    this.orientation = orientation;
    this.min = (min == null) ? 0 : min.getMillis();
    this.max = (max == null) ? Long.MAX_VALUE : max.getMillis();
    this.frequency = frequency.getMillis();
    this.id = String.join("", EXPIRATION_JOB_PREFIX, UUID.randomUUID().toString());
}

public final String getId() {
    return id;
}

public final long getFrequency() {
    return frequency;
}

/**
 * Calculates the delay for the next trigger time. When now is in a
 * valid time bracket with respect to expirationDate, the delay is 0.
 * When now is before the time bracket, than delay to the start of the
 * time bracket and when now is passed the valid time bracket, the delay
 * is null
 * @param expirationDate license expiry date in milliseconds
 * @param now current time in milliseconds
 * @return time delay
 */
final TimeValue delay(long expirationDate, long now) {
    final TimeValue delay;
    switch (orientation) {
        case PRE:
            if (expirationDate >= now) {
                // license not yet expired
                long preExpiryDuration = expirationDate - now;
                if (preExpiryDuration > max) {
                    // license duration is longer than maximum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(preExpiryDuration - max);
                } else if (preExpiryDuration <= max && preExpiryDuration >= min) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            }
    }
}

```

```

    }
  } else {
    // invalid after license expiry
    delay = null;
  }
  break;
case POST:
  if (expirationDate >= now) {
    // license not yet expired, delay it to the first match time
    delay = TimeValue.timeValueMillis(expirationDate - now + min);
  } else {
    // license has expired
    long expiredDuration = now - expirationDate;
    if (expiredDuration < min) {
      // license expiry duration is shorter than minimum duration, delay it to the first match time
      delay = TimeValue.timeValueMillis(min - expiredDuration);
    } else if (expiredDuration >= min && expiredDuration <= max) {
      // no delay in valid time bracket
      delay = TimeValue.timeValueMillis(0);
    } else {
      // passed last match time
      delay = null;
    }
  }
  break;
default:
  throw new IllegalStateException("orientation [" + orientation + "] unknown");
}
return delay;
}

/**
 * {@link SchedulerEngine.Schedule#nextScheduledTimeAfter(long, long)} with respect to
 * license expiry date
 */
public final long nextScheduledTimeForExpiry(long expiryDate, long startTime, long time) {
  TimeValue delay = delay(expiryDate, time);
  if (delay != null) {
    long delayInMillis = delay.getMillis();
    if (delayInMillis == 0L) {
      if (startTime == time) {
        // initial trigger and in time bracket, schedule immediately
        return time;
      } else {
        // in time bracket, add frequency
        return time + frequency;
      }
    }
  } else {

```

```

        // not in time bracket
        return time + delayInMillis;
    }
}
return -1;
}

/**
 * Code to execute when the expiry callback is triggered in a valid
 * time bracket
 * @param license license to operate on
 */
public abstract void on(License license);

public final String toString() {
    return LoggerMessageFormat.format(null, "ExpirationCallback:(orientation [{}], min [{}], max [{}], freq
[{}])",
        orientation.name(), TimeValue.timeValueMillis(min), TimeValue.timeValueMillis(max),
        TimeValue.timeValueMillis(frequency));
}
}
{
"metadata": {
    "name": "X-Pack Monitoring: License Expiration",
    "xpack": {
        "link": "license",
        "expires_days": [ 60, 30, 14, 7 ],
        "severity": 0,
        "alert_index": ".monitoring-alerts-6",
        "cluster_uuid": "${monitoring.watch.cluster_uuid}",
        "type": "monitoring",
        "version_created": 6020099,
        "watch": "${monitoring.watch.id}"
    }
},
"trigger": {
    "schedule": {
        "interval": "1m"
    }
},
"input": {
    "chain": {
        "inputs": [
            {
                "check": {
                    "search": {
                        "request": {
                            "indices": [

```

```

    ".monitoring-es-*"
  ],
  "body": {
    "size": 1,
    "sort": [
      {
        "timestamp": {
          "order": "desc"
        }
      }
    ],
    "_source": [
      "license.*"
    ],
    "query": {
      "bool": {
        "filter": [
          {
            "term": {
              "cluster_uuid": "{{ctx.metadata.xpack.cluster_uuid}}"
            }
          },
          {
            "term": {
              "type": "cluster_stats"
            }
          },
          {
            "range": {
              "timestamp": {
                "gte": "now-2m"
              }
            }
          }
        ]
      }
    }
  }
},
{
  "alert": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-alerts-6"
        ]
      }
    }
  }
}

```



```

    ],
    "body": {
      "size": 1,
      "terminate_after": 1,
      "query": {
        "bool": {
          "filter": {
            "term": {
              "_id": "{{ctx.watch_id}}"
            }
          }
        }
      },
      "sort": [
        { "timestamp": { "order": "desc" } }
      ]
    }
  }
},
{
  "kibana_settings": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-kibana-6-*"
        ],
        "body": {
          "size": 1,
          "query": {
            "bool": {
              "filter": {
                "term": {
                  "type": "kibana_settings"
                }
              }
            }
          },
          "sort": [
            {
              "timestamp": {
                "order": "desc"
              }
            }
          ]
        }
      }
    }
  }
}

```

```

    }
  }
}
],
},
"condition": {
  "script": {
    "source": "if (ctx.payload.check.hits.total == 0) {return false;}def license =
ctx.payload.check.hits.hits[0]._source.license;if (license == null) {return false;}ctx.vars.fails_check = false;Instant
expiry = Instant.ofEpochMilli(license.expiry_date_in_millis);ctx.vars.expiry = expiry;if (license.status != 'active')
{ctx.vars.expired = true;ctx.vars.fails_check = true;ctx.metadata.xpack.severity = 2001;} else {Instant now =
Instant.ofEpochMilli(new Date().getTime());ctx.vars.now = now;for (int i = ctx.metadata.xpack.expires_days.length
- 1;i > -1;--i) {if (license.type == 'trial' && i < 2) {break;}Instant fromNow =
now.plusSeconds(ctx.metadata.xpack.expires_days[i] * 24 * 60 * 60);if (fromNow.isAfter(expiry))
{ctx.vars.fails_check = true;ctx.metadata.xpack.severity = i * 1000;break;}} }ctx.vars.not_resolved =
(ctx.payload.alert.hits.total == 1 && ctx.payload.alert.hits.hits[0]._source.resolved_timestamp ==
null);ctx.vars.update = ctx.vars.fails_check || ctx.vars.not_resolved;"
  }
},
"transform": {
  "script": {
    "source": "ctx.vars.email_recipient = (ctx.payload.kibana_settings.hits.total > 0) ?
ctx.payload.kibana_settings.hits.hits[0]._source.kibana_settings.xpack.default_admin_email : null;ctx.vars.is_new =
ctx.vars.fails_check && !ctx.vars.not_resolved;ctx.vars.is_resolved = !ctx.vars.fails_check &&
ctx.vars.not_resolved;def alertMessage = null;if (ctx.vars.fails_check) { alertMessage = 'Update your license.}; } if
(ctx.vars.not_resolved) { ctx.payload = ctx.payload.alert.hits.hits[0]._source;ctx.payload.metadata =
ctx.metadata.xpack;if (ctx.vars.fails_check == false) { ctx.payload.resolved_timestamp = ctx.execution_time;} }
else { ctx.payload = [ 'timestamp': ctx.execution_time, 'prefix': 'This cluster\\'s license is going to expire in
{{#relativeTime}}metadata.time{{/relativeTime}} at {{#absoluteTime}}metadata.time{{/absoluteTime}}.',
'message': alertMessage, 'metadata': ctx.metadata.xpack ];} if (ctx.vars.fails_check) { ctx.payload.metadata.time =
ctx.vars.expiry.toString();} ctx.payload.update_timestamp = ctx.execution_time;return ctx.payload;"
  }
},
"actions": {
  "add_to_alerts_index": {
    "index": {
      "index": ".monitoring-alerts-6",
      "doc_type": "doc",
      "doc_id": "${monitoring.watch.unique_id}"
    }
  },
  "send_email_to_admin": {
    "condition": {
      "script": "return ctx.vars.email_recipient != null && (ctx.vars.is_new || ctx.vars.is_resolved)"
    },
    "email": {
      "to": "X-Pack Admin <{{ ctx.vars.email_recipient }}>",

```

```

"from": "X-Pack Admin <{{ ctx.vars.email_recipient }}>",
"subject":
"[[{{#ctx.vars.is_new}}NEW{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}RESOLVED[{{/ctx.vars.is_resolved}}]
[{{ctx.metadata.name}}]",
"body": {
  "text": "[{{#ctx.vars.is_resolved}}This cluster alert has been resolved: [{{/ctx.vars.is_resolved}}] This cluster's
license [{{#ctx.vars.is_new}}]is going to expire on
[{{ctx.payload.metadata.time}}]{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}was going to
expire[{{ctx.payload.metadata.time}}]{{/ctx.vars.is_resolved}}.
[{{#ctx.vars.is_new}}]{{ctx.payload.message}}[{{/ctx.vars.is_new}}]"
  }
}
}
}
}
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```

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```

*
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*
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* or more contributor license agreements. Licensed under the Elastic License;
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*/
package org.elasticsearch.license;

```

```

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.ml.action.CloseJobAction;
import org.elasticsearch.xpack.core.ml.action.DeleteDatafeedAction;

```

```

import org.elasticsearch.xpack.core.ml.action.DeleteJobAction;
import org.elasticsearch.xpack.core.ml.action.GetDatafeedsStatsAction;
import org.elasticsearch.xpack.core.ml.action.GetJobsStatsAction;
import org.elasticsearch.xpack.core.ml.action.OpenJobAction;
import org.elasticsearch.xpack.core.ml.action.PutDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.PutJobAction;
import org.elasticsearch.xpack.core.ml.action.StartDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.StopDatafeedAction;
import org.elasticsearch.xpack.core.ml.client.MachineLearningClient;
import org.elasticsearch.xpack.core.ml.datafeed.DatafeedState;
import org.elasticsearch.xpack.core.ml.job.config.JobState;
import org.elasticsearch.persistent.PersistentTasksCustomMetaData;
import org.elasticsearch.xpack.ml.LocalStateMachineLearning;
import org.elasticsearch.xpack.ml.support.BaseMlIntegTestCase;
import org.junit.Before;

import java.util.Collections;

import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;

@TestLogging("org.elasticsearch.xpack.ml.action:DEBUG")
public class MachineLearningLicensingTests extends BaseMlIntegTestCase {

    @Before
    public void resetLicensing() {
        enableLicensing();

        ensureStableCluster(1);
        ensureYellow();
    }

    public void testMachineLearningPutJobActionRestricted() throws Exception {
        String jobId = "testmachinelearningputjobactionrestricted";
        // Pick a license that does not allow machine learning
        License.OperationMode mode = randomInvalidLicenseType();
        enableLicensing(mode);
        assertMLAllowed(false);
        // test that license restricted apis do not work
        Settings settings = internalCluster().transportClient().settings();
        try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
            client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        }
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        listener.actionGet();
        fail("put job action should not be enabled!");
    }
}

```



```

    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        PutJobAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testMachineLearningOpenJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningopenjobactionrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response response = putJobListener.actionGet();
        assertNotNull(response);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
        listener.actionGet();
        fail("open job action should not be enabled!");
    }
}

```

```

    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);

    // now that the license is invalid, the job should get closed:
    assertBusy() -> {
        JobState jobState = getJobStats(jobId).getState();
        assertEquals(JobState.CLOSED, jobState);
    });

    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
        OpenJobAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testMachineLearningPutDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningputdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
}

```

```

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
    listener.actionGet();
    fail("put datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);
// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
    PutDatafeedAction.Response response = listener.actionGet();
    assertNotNull(response);
}
}

public void testAutoCloseJobWithDatafeed() throws Exception {
    String jobId = "testautoclosejobwithdatafeed";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        // put job
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    }
}

```

```

PutJobAction.Response putJobResponse = putJobListener.actionGet();
assertNotNull(putJobResponse);
// put datafeed
PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
new MachineLearningClient(client).putDatafeed(
    new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
        Collections.singletonList(datafeedIndex))), putDatafeedListener);
PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
assertNotNull(putDatafeedResponse);
// open job
PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
OpenJobAction.Response openJobResponse = openJobListener.actionGet();
assertNotNull(openJobResponse);
// start datafeed
PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
}

if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {
    disableLicensing();
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

enableLicensing(randomValidLicenseType());
assertMLAllowed(true);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    // open job

```

```

PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
OpenJobAction.Response openJobResponse = openJobListener.actionGet();
assertNotNull(openJobResponse);
// start datafeed
PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
}

assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.OPENED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STARTED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(2, tasks.taskMap().size());
});

if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {
    disableLicensing();
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});
}

public void testMachineLearningStartDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningstartdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
}

```

```

String datafeedIndex = jobId + "-data";
prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
    XContentType.JSON).get();
// test that license restricted apis do now work
Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
    PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
            Collections.singletonList(datafeedIndex))), putDatafeedListener);
    PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
    assertNotNull(putDatafeedResponse);
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);

// now that the license is invalid, the job should get closed:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
    fail("start datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {

```

```

    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        // re-open job now that the license is valid again
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);

        PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
        StartDatafeedAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testMachineLearningStopDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningstopdatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
    }
}

```

```

PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
assertNotNull(putDatafeedResponse);
PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
OpenJobAction.Response openJobResponse = openJobListener.actionGet();
assertNotNull(openJobResponse);
PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
new MachineLearningClient(client).startDatafeed(
    new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
assertNotNull(startDatafeedResponse);
}

boolean invalidLicense = randomBoolean();
if (invalidLicense) {
    enableLicensing(randomInvalidLicenseType());
} else {
    enableLicensing(randomValidLicenseType());
}

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
PlainActionFuture<StopDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).stopDatafeed(new StopDatafeedAction.Request(datafeedId), listener);
if (invalidLicense) {
    // the stop datafeed due to invalid license happens async, so check if the datafeed turns into stopped state:
    assertBusy(() -> {
        GetDatafeedsStatsAction.Response response =
            new MachineLearningClient(client)
                .getDatafeedsStats(new GetDatafeedsStatsAction.Request(datafeedId)).actionGet();
        assertEquals(DatafeedState.STOPPED, response.getResponse().results().get(0).getDatafeedState());
    });
} else {
    listener.actionGet();
}

if (invalidLicense) {
    // the close due to invalid license happens async, so check if the job turns into closed state:
    assertBusy(() -> {
        GetJobsStatsAction.Response response =
            new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
        assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
    });
}
}
}
}

```



```

public void testMachineLearningCloseJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }

    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        enableLicensing(randomValidLicenseType());
    }

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<CloseJobAction.Response> listener = PlainActionFuture.newFuture();
        CloseJobAction.Request request = new CloseJobAction.Request(jobId);
        request.setCloseTimeout(TimeValue.timeValueSeconds(20));
        if (invalidLicense) {
            // the close due to invalid license happens async, so check if the job turns into closed state:
            assertBusy(() -> {
                GetJobsStatsAction.Response response =
                    new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
                assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
            });
        } else {
            new MachineLearningClient(client).closeJob(request, listener);
            listener.actionGet();
        }
    }
}

public void testMachineLearningDeleteJobActionNotRestricted() throws Exception {

```

```

String jobId = "testmachinelearningclosejobactionnotrestricted";
assertMLAllowed(true);
// test that license restricted apis do now work
Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
}

// Pick a random license
License.OperationMode mode = randomLicenseType();
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).deleteJob(new DeleteJobAction.Request(jobId), listener);
    listener.actionGet();
}
}

public void testMachineLearningDeleteDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningdeletedatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(jobId))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
    }

    // Pick a random license

```

```

License.OperationMode mode = randomLicenseType();
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<DeleteDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).deleteDatafeed(new DeleteDatafeedAction.Request(datafeedId),
listener);
    listener.actionGet();
}
}

private static OperationMode randomInvalidLicenseType() {
return randomFrom(License.OperationMode.GOLD, License.OperationMode.STANDARD,
License.OperationMode.BASIC);
}

private static OperationMode randomValidLicenseType() {
return randomFrom(License.OperationMode.TRIAL, License.OperationMode.PLATINUM);
}

private static OperationMode randomLicenseType() {
return randomFrom(License.OperationMode.values());
}

private static void assertMLAllowed(boolean expected) {
for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
    assertEquals(licenseState.isMachineLearningAllowed(), expected);
}
}

public static void disableLicensing() {
disableLicensing(randomValidLicenseType());
}

public static void disableLicensing(License.OperationMode operationMode) {
for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
    licenseState.update(operationMode, false, null);
}
}

public static void enableLicensing() {
enableLicensing(randomValidLicenseType());
}

public static void enableLicensing(License.OperationMode operationMode) {
for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {

```

```

        licenseState.update(operationMode, true, null);
    }
}
}
---
teardown:
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
8o2e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWH0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGn1IIZlpYcVVTnFrcTE2dzhJZmZrdFQRn3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOuml4MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dlMbmMzSGtQ
c3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlVl2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQBzhvozA0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXC18kX1SrgoFn1bXq61IvJwfw5qnmYNiH3hRhTO9EyaCBqaLk8
NXZQ6TrRkQSpEnnBwAYUkZeKXsIuBoOk4B4mzWC/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWkbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"}]}
---

```

"Installing and getting license works":

```

## current license version
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
8o2e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWH0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGn1IIZlpYcVVTnFrcTE2dzhJZmZrdFQRn3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOuml4MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dlMbmMzSGtQ
c3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlVl2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQBzhvozA0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXC18kX1SrgoFn1bXq61IvJwfw5qnmYNiH3hRhTO9EyaCBqaLk8
NXZQ6TrRkQSpEnnBwAYUkZeKXsIuBoOk4B4mzWC/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWkbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"}]}
---
- match: { license_status: "valid" }

```

```

- do:
  xpack.license.get: { }

## a license object has 11 attributes
- length: { license: 11 }

## bwc for licenses format
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"max
x_nodes":1,"issued_to":"issued_to","issuer":"issuer","signature":"AAAAAwAAAA2T3vqdBBetKQaBgxipAAAB
mC9Zn0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2M
XMvRFk4d3JTZEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS09
5MXRGN1lIZlpYcVVTTnFrcTE2dzhJZmZrdFQRn3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEph
ZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOE
hQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2V
E1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6ldMbmMzS
GtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB7pG
FYgawfLm9zzT80LvcLHjy1t/v2uSzCQWKdXXhrwSy4WrAH2uK/+PEiQ7aEpW5erLsyJ5KLA6OEZJDaP7r+mj
OPuLt0++15j4DMn7ybMzOPHXWbc6LETE3+pp0GZPyOmwsDkZSRUegTtcIR2R6z+mdnGrhOYm80y08Kvw
whdU/DHw41MK7ePo6tq73Nz49y9lDgt9fxA0t4ggEBPbnTDDBVQ25AjauY8sa0M5eg9rDDRyww1KamYWwrra8
PIGX+2YjhtUeQhmlCPdlxc9wECJ7/knPss5bI3ZoXQR3fyXhjcXNnHEIsblqLrMCa13pLxs7II+KPYMa2ZYL/am4
P"}]}

- match: { license_status: "valid" }

- do:
  xpack.license.get: { }

- length: { license: 11 }

## license version: 1.x
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"subscription","subscription_type":"gold","issue_date_in_millis":1411948800000,"feature":
"shield","expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature
":"AAAAAQAAAA0LVAYwWpSH94cyXr4zAAABmC9Zn0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVo
MVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEx3R3RRZ0pzU3lobWJKZnQvSEFva0pp
THBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1lIZlpYcVVTTnFrcTE2dzhJZmZrdFQRn3JQeG
wxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNi
WktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K

```

```
055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9w
TTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2
bDRWUzh6UG5pdENGWFRreXNKNke9PQAAAQA4qsc/URRZVdFoLwgy9dqybYEQWLW8YLkiAyPV5XHHH
dtk+dtZiEpiNEDkUXhSX2waVJlsNRF8/4kqplDfwNoD2TUM8fTgiIfiSiZYGDTGST+yW/5eAveEU5J5v1liBN27b
wkqL+V4YAa0Tcm7NKKwjScWKAHiTU3vF8chPkGfCHE0kQgVwPC9RE82pT0s6/uR4PflGNFfqPM0uiE5n
ucfVrtj89JQiO/KA/7ZyFbo7VTNXxZQt7T7rZWBCP9KIjptXzcWuk08Q5S+rSoJNYbFo3HGKtrCVsRz/55rceNtd
wKKXu1IwnSeir4I1/KLduQTtFLy0+1th87VS8T88UT" ]}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
## multiple licenses version: 1.x
```

```
- do:
```

```
  xpack.license.post:
```

```
    acknowledge: true
```

```
    body: |
```

```
      { "licenses": [ { "uid": "893361dc-9749-4997-93cb-
```

```
802e3d7fa4a8", "type": "internal", "subscription_type": "none", "issue_date_in_millis": 1411948800000, "feature": "shield", "expiry_date_in_millis": 1440892799999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAQAAAA04Q4ky3rFyyWLFkytEAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWKprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1lIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUmI4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNke9PQAAAQBxMvUMn4h2E4R4TQMijahTxQj4LPQO4f1M79UxX/XkDIgCh+J5pRHx08OrTRPsFL1IED+h+PIXx307Vo+PNDsOxrWvoYZeYBkOLAO3ny9vhQga+52jYhMxIuFrT9xbcSCSNpMhGojgOIPU2WgiopVdVcimo1+Gk8VtkIPB1wPwFzfOjOnPgp/Icx3WYpfkeAUUOyWUYiFIBAE4bnz84iF+XwLkBgYk6aHF25ECBtd/Uruhcm9+jEFpoIEUtCouvV9kC+NJZ4OickV4xpRgaRG2x9PONH8ZN0QGHgYhJGbisocXuDmlLsyVxqxfMu3n/r7/jdsEJSjAIsrSLDOu6H" }, { "uid": "893361dc-9749-4997-93cb-
```

```
802e3dofh7aa", "type": "internal", "subscription_type": "none", "issue_date_in_millis": 1443484800000, "feature": "waterher", "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAQAAAA0Sc90guRIaQEEmgLvMnAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWKprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1lIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUmI4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNke9PQAAAQC94dju0pnDZR3Uuyipi0ic3aQJ+nvVqe+U8u79Dga5n1qIjcHDh7HvIBJEkF+tnVPlo/PXV/x7BZSwVY1PVerit+6rYix1yuHEgqwxmx/VdRICjCaZM6tk0Ob4dZCPv6Ebn2Mmk89KHC/PwiLpQf6QfV/Pkpa8k2A3ORJmvYSDvXhe6tCs8dq4ebrsFxqrZjwWh5CZSpzqqZBFXIngDv2N0hHhpGlueRszD0JJ5dfEL5ZA1DDOrgO9OJvejSHyRqe1L5QRUNdXPVfS+EAG0Dd1cNdJ/sMpYCPnVjBw6iq2/YgM3cuztsX
```

```
VBY7ij4WnoP3ce7Zjs9TwHn+IqzftC6"}}}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
- match: { license.uid: "893361dc-9749-4997-93cb-802e3dofh7aa" }
```

```
---
```

```
"Should throw 404 after license deletion":
```

```
- do:
```

```
  xpack.license.delete: { }
```

```
- match: { acknowledged: true }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
  catch: missing
```

```
---
```

```
"Should install a feature type license":
```

```
  # VERSION_NO_FEATURE_TYPE license version
```

```
- do:
```

```
  xpack.license.post:
```

```
    acknowledged: true
```

```
    body: |
```

```
      { "license": { "uid": "893361dc-9749-4997-93cb-
```

```
802e3d7fa4a8", "type": "gold", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issued_to", "issuer": "issuer", "signature": "AAAAAgAAAA3U8+YmnmvWC+CWsV/mRAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVklPSmkxakxZdW5IMlhITHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0IDalZCS095MXRGN1IIZlPyCvVTTnFrcTE2dzhJZmZrdFQRn3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNsXNswWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzvhFeTFoM1Q0RnJXSG53Mwk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTtJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlV2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQBe8GfzDm6T537IuuVjetb3xK5dvg0K5NQapv+rczWcQFxcGuzbF8plkgetP1aAGZP4uRESdQPMIOCsx4d0UqqAm9f7GbbQ3193P+PogInPFehE9NvOmaAQovmxVM9SE6DsDqlX4cXSO+bgWpXPTd2LmpoQc1fXd6BZ8GeuyYpVHVkP9hVU0tAYjw6HzYOE7+zuO1oJYOxElqy66AnIfkvHrvni+flym3tE7tDTgsDRaz7W3iBhaqiSntEqabEkvHdPHQdSR99XGaEvnHO1paK01/35iZf6OXHsF7CCj+558GRXiVxzueOe7TsGSSt8g7YjZwV9bRCyU7oB4B/nidgI" } }
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

- length: { license: 11 }

"Cannot start basic":

- do:

catch: bad_request
xpack.license.post:
acknowledge: true
body: |

```
{ "license": { "uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "basic", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAgAAAA0IKPZ0a7aZquUltho/AAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDByWnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAQAALuQ44S3IG6SzolcXVJ6Z4CIXORDrYQ+wdLceey0XdujTslAOj+k+vNgo6wauc7Uswi01esHu4lb5IgpvKy7RRCbh5bj/z2ubu2qMJqopp9BQyD7VQjVfqmG6seUMJwJ1a5Avvm9r41YPSPr3bKK2e1l6jK6N8ibCvnTyY/XkYGCJrBWT SJepDbg6ErbyodrZ37x1StLbPWcNAkmweyHjDJnvYnbeZZO7A3NmubXZjW7Ttf8/YwQyE00PqMcl7fVPY3hkKpAeHf8aaJbqkKYbqZuER3EWJX7ZvLVb1dNdNg8aXRn7YrkQcYwWgptYQpfV+D7yEJ4j5muAEoler" } }
```

- match: { error.root_cause.0.reason: 'Installing basic licenses is no longer allowed. Use the POST /_xpack/license/start_basic API to install a basic license that does not expire.' }

"Should fail gracefully when body content is not provided":

- do:

catch: bad_request
xpack.license.post:
acknowledge: true

- match: { error.root_cause.0.reason: 'The license must be provided in the request body' }

"Current license is trial means not eligible to start trial":

- do:

xpack.license.get_trial_status: { }

- match: { eligible_to_start_trial: false }

- do:

xpack.license.post_start_basic:
acknowledge: true


```

- match: { basic_was_started: true }

- do:
  xpack.license.get_trial_status: {}

- match: { eligible_to_start_trial: false }

- do:
  catch: forbidden
  xpack.license.post_start_trial:
    acknowledge: true

- match: { trial_was_started: false }
- match: { error_message: "Operation failed: Trial was already activated." }
---
"Trial license cannot be basic":
- do:
  catch: bad_request
  xpack.license.post_start_trial:
    type: "basic"
    acknowledge: true
---
"Can start basic license if do not already have basic":
- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: true }

- do:
  xpack.license.post_start_basic:
    acknowledge: true

- match: { basic_was_started: true }
- match: { acknowledged: true }

- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: false }

- do:
  catch: forbidden
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: true }
- match: { error_message: "Operation failed: Current license is basic." }
---

```

```

"Must acknowledge to start basic":
- do:
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: false }
- match: { error_message: "Operation failed: Needs acknowledgement." }
{
"xpack.license.delete": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["DELETE"],
  "url": {
    "path": "/_xpack/license",
    "paths": ["/_xpack/license"],
    "parts" : {}
  },
  "body": null
}
}
{
"xpack.license.get": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["GET"],
  "url": {
    "path": "/_xpack/license",
    "paths": ["/_xpack/license"],
    "parts" : {
    },
    "params": {
      "local": {
        "type" : "boolean",
        "description" : "Return local information, do not retrieve the state from master node (default: false)"
      }
    }
  },
  "body": null
}
}
{
"xpack.license.post_start_basic": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["POST"],
  "url": {
    "path": "/_xpack/license/start_basic",
    "paths": ["/_xpack/license/start_basic"],
    "parts" : {
    },
    "params": {

```

```

    "acknowledge": {
      "type" : "boolean",
      "description" : "whether the user has acknowledged acknowledge messages (default: false)"
    }
  },
  "body": null
}
}
{
  "xpack.license.get_trial_status": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["GET"],
    "url": {
      "path": "/_xpack/license/trial_status",
      "paths": ["/_xpack/license/trial_status"],
      "parts" : {
      },
      "params": {
      }
    },
    "body": null
  }
}
{
  "xpack.license.post": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["PUT", "POST"],
    "url": {
      "path": "/_xpack/license",
      "paths": ["/_xpack/license"],
      "parts" : {
      },
      "params": {
        "acknowledge": {
          "type" : "boolean",
          "description" : "whether the user has acknowledged acknowledge messages (default: false)"
        }
      }
    },
    "body": {
      "description" : "licenses to be installed"
    }
  }
}
{
  "xpack.license.post_start_trial": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",

```

```

"methods": ["POST"],
"url": {
  "path": "/_xpack/license/start_trial",
  "paths": ["/_xpack/license/start_trial"],
  "parts": {
  },
  "params": {
    "type": {
      "type": "string",
      "description": "The type of trial license to generate (default: \"trial\")"
    },
    "acknowledge": {
      "type": "boolean",
      "description": "whether the user has acknowledged acknowledge messages (default: false)"
    }
  }
},
"body": null
}
}
{
  "xpack.license.get_basic_status": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["GET"],
    "url": {
      "path": "/_xpack/license/basic_status",
      "paths": ["/_xpack/license/basic_status"],
      "parts": {
      },
      "params": {
      }
    },
    "body": null
  }
}

```

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Dropwizard

Copyright 2010-2013 Coda Hale and Yammer, Inc., 2014-2016 Dropwizard Team

This product includes software developed by Coda Hale and Yammer, Inc.

Apache Log4j SLF4J Binding

Copyright 1999-2017 The Apache Software Foundation

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

Apache XML Security for Java

Copyright 2000-2016 The Apache Software Foundation

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
<head>
```

```
<meta charset="utf-8">
```

```
<link rel="dns-prefetch" href="https://assets-cdn.github.com">
```

```
<link rel="dns-prefetch" href="https://avatars0.githubusercontent.com">
```

```
<link rel="dns-prefetch" href="https://avatars1.githubusercontent.com">
```

```
<link rel="dns-prefetch" href="https://avatars2.githubusercontent.com">
```

```
<link rel="dns-prefetch" href="https://avatars3.githubusercontent.com">
```

```
<link rel="dns-prefetch" href="https://github-cloud.s3.amazonaws.com">
```

```
<link rel="dns-prefetch" href="https://user-images.githubusercontent.com/">
```

```
<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/frameworks-2d2d4c150f7000385741c6b992b302689ecd172246c6428904e0813be9bceca6.css" media="all" rel="stylesheet" />
```

```
<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/github-0522ae8d3b3bdc841d2f91f90efd5f1fd9040d910905674cd134ced43a6dfea6.css" media="all" rel="stylesheet" />
```

```
<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/site-cfab053e93f0e27f4c63d4ff6b7957bd25f711667fe678e747f8a4d88c47b38d.css" media="all" rel="stylesheet" />
```

```
<meta name="viewport" content="width=device-width">
```

```
<title>cryptacular/NOTICE at master · vt-middleware/cryptacular · GitHub</title>
```

```
<link rel="search" type="application/opensearchdescription+xml" href="/opensearch.xml" title="GitHub">
```

```
<link rel="fluid-icon" href="https://github.com/fluidicon.png" title="GitHub">
```

```
<meta property="fb:app_id" content="1401488693436528">
```

```
<meta content="https://avatars7.githubusercontent.com/u/6122907?v=4&s=400" property="og:image" /><meta content="GitHub" property="og:site_name" /><meta content="object" property="og:type" /><meta content="vt-middleware/cryptacular" property="og:title" /><meta content="https://github.com/vt-middleware/cryptacular" property="og:url" /><meta content="cryptacular - The friendly complement to the BouncyCastle crypto API for Java." property="og:description" />
```

```
<link rel="assets" href="https://assets-cdn.github.com/">
```

```
<meta name="pjax-timeout" content="1000">
```

```
<meta name="request-id" content="E0E4:26F16:12A5AE6:1D11801:596C7978" data-pjax-transient>
```

```
<meta name="selected-link" value="repo_source" data-pjax-transient>
```

```
<meta name="google-site-verification" content="KT5gs8h0wvaagLKA V W q 8 b b e N w n Z Z K 1 r 1 X Q y s X 3 x u r L U ">
```

```
<meta name="google-site-verification" content="ZzhVyEFwb7w3e0-uOTlm8Jsck2F5StVihD0exw2fsA">
```

```
<meta name="google-analytics" content="UA-3769691-2">
```

```
<meta content="collector.githubapp.com" name="octolytics-host" /><meta content="github" name="octolytics-app-id" /><meta content="https://collector.githubapp.com/github-external/browser_event" name="octolytics-event-url" /><meta content="E0E4:26F16:12A5AE6:1D11801:596C7978" name="octolytics-dimension-request_id" /><meta content="sea" name="octolytics-dimension-region_edge" /><meta content="iad" name="octolytics-dimension-region_render" />
```

```
<meta content="/<user-name>/<repo-name>/blob/show" data-pjax-transient="true" name="analytics-location" />
```

```
<meta class="js-ga-set" name="dimension1" content="Logged Out">
```

```
<meta name="hostname" content="github.com">
<meta name="user-login" content="">

<meta name="expected-hostname" content="github.com">
<meta name="js-proxy-site-detection-payload"
content="N2ZhMjk0NTA4MjI1NmZhYTVINzM5NzVjZmFkOWY2NGFkNmMxYzcyMGViNzAzZGQxMGMzZ
mJhZDQ3YWZiZTI0OHx7InJlbW90ZV9hZGRyZXNzIjoiMTEwLjIwLjIyMC4xMzUiLCJyZXF1ZXN0X2lkIjoiR
TBFNDoyNkYxNjoxMkE1QUU2OjFEMTE4MDE6NTk2Qzc5NzgiLCJ0aW1lc3RhbXAiOjE1MDAyODEyMDgsI
mhvc3QiOiJnaXRodWIuY29tIn0=">

<meta name="html-safe-nonce" content="5aa226b80a18dc40894e1d405e4eb31cfca7d616">

<meta http-equiv="x-pjax-version" content="f682644ce1bb9629b9d9d9bedf64801b">

<link href="https://github.com/vt-middleware/cryptacular/commits/master.atom" rel="alternate" title="Recent
Commits to cryptacular:master" type="application/atom+xml">

<meta name="description" content="cryptacular - The friendly complement to the BouncyCastle crypto API for
Java.">
<meta name="go-import" content="github.com/vt-middleware/cryptacular git https://github.com/vt-
middleware/cryptacular.git">

<meta content="6122907" name="octolytics-dimension-user_id" /><meta content="vt-middleware"
name="octolytics-dimension-user_login" /><meta content="15714989" name="octolytics-dimension-repository_id"
/><meta content="vt-middleware/cryptacular" name="octolytics-dimension-repository_nwo" /><meta
content="true" name="octolytics-dimension-repository_public" /><meta content="false" name="octolytics-
dimension-repository_is_fork" /><meta content="15714989" name="octolytics-dimension-
repository_network_root_id" /><meta content="vt-middleware/cryptacular" name="octolytics-dimension-
repository_network_root_nwo" /><meta content="false" name="octolytics-dimension-
repository_explore_github_marketplace_ci_cta_shown" />

<link rel="canonical" href="https://github.com/vt-middleware/cryptacular/blob/master/NOTICE" data-pjax-
transient>

<meta name="browser-stats-url" content="https://api.github.com/_private/browser/stats">

<meta name="browser-errors-url" content="https://api.github.com/_private/browser/errors">

<link rel="mask-icon" href="https://assets-cdn.github.com/pinned-octocat.svg" color="#000000">
<link rel="icon" type="image/x-icon" href="https://assets-cdn.github.com/favicon.ico">

<meta name="theme-color" content="#1e2327">
```

```
</head>

<body class="logged-out env-production page-blob">

<div class="position-relative js-header-wrapper">
  <a href="#start-of-content" tabindex="1" class="px-2 py-4 show-on-focus js-skip-to-content">Skip to content</a>
  <div id="js-pjax-loader-bar" class="pjax-loader-bar"><div class="progress"></div></div>

  <header class="site-header js-details-container Details" role="banner">
    <div class="site-nav-container">
      <a class="header-logo-invertocat" href="https://github.com/" aria-label="Homepage" data-ga-click="(Logged out)
      Header, go to homepage, icon:logo-wordmark">
        <svg aria-hidden="true" class="octicon octicon-mark-github" height="32" version="1.1" viewBox="0 0 16 16"
        width="32"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59.47.17.55-.17.55-.38 0-.19-.01-.82-.01-1.49-2.01-3.7-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53.63-.01 1.08.58
        1.23.82.72 1.21 1.87.87 2.33.66.07-.52.28-.87.51-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87.31-1.59.82-2.15-.08-.2-.36-
        1.02.08-2.12 0 0 .67-.21 2.28.64-.18 1.32-.27 2-.27.68 0 1.36.09 2 .27 1.53-1.04 2.2-.82 2.2-.82.44 1.1.16 1.92.08
        2.12.51.56.82 1.27.82 2.15 0 3.07-1.87 3.75-3.65 3.95.29.25.54.73.54 1.48 0 1.07-.01 1.93-.01 2.2 0
        .21.15.46.55.38.82.01.38.01 8.013 8.013 0 0 16 8c0-4.42-3.58-8-8z"/></svg>
      </a>

      <button class="btn-link float-right site-header-toggle js-details-target" type="button" aria-label="Toggle
      navigation" aria-expanded="false">
        <svg aria-hidden="true" class="octicon octicon-three-bars" height="24" version="1.1" viewBox="0 0 12 16"
        width="18"><path fill-rule="evenodd" d="M11.41 9H.59C0 9 0 8.59 0 8c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0
        .59 0 1-.59 1h.01zm0-4H.59C0 5 0 4.59 0 4c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1h.01zM.59
        11H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1H.59C0 13 0 12.59 0 12c0-.59 0-1 .59-1z"/></svg>
      </button>

      <div class="site-header-menu">
        <nav class="site-header-nav">
          <a href="/features" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
          item:features" data-selected-links="/features /features/code-review /features/project-management
          /features/integrations /features">
            Features
          </a>
          <a href="/business" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu
          - item:business" data-selected-links="/business /business/security /business/customers /business">
            Business
          </a>
        </nav>
      </div>
    </div>
  </header>

```



```
</a> <a href="/explore" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu - item:explore" data-selected-links="/explore /trending /trending/developers /stars /integrations /integrations/feature/code /integrations/feature/collaborate /integrations/feature/ship showcases showcases_search showcases_landing /explore">
```

Explore

```
</a> <a href="/marketplace" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu - item:marketplace" data-selected-links="/marketplace">
```

Marketplace

```
</a> <a href="/pricing" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu - item:pricing" data-selected-links="/pricing /pricing/developer /pricing/team /pricing/business-hosted /pricing/business-enterprise /pricing">
```

Pricing

```
</a> </nav>
```

```
<div class="site-header-actions">
  <div class="header-search scoped-search site-scoped-search js-site-search" role="search">
    <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="/vt-
    middleware/cryptacular/search" class="js-site-search-form" data-scoped-search-url="/vt-
    middleware/cryptacular/search" data-unscoped-search-url="/search" method="get"><div
    style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden" value="#x2713;" /></div>
    <label class="form-control header-search-wrapper js-chromeless-input-container">
      <a href="/vt-middleware/cryptacular/blob/master/NOTICE" class="header-search-scope no-underline">This
      repository</a>
      <input type="text"
        class="form-control header-search-input js-site-search-focus js-site-search-field is-clearable"
        data-hotkey="s"
        name="q"
        value=""
        placeholder="Search"
        aria-label="Search this repository"
        data-unscoped-placeholder="Search GitHub"
        data-scoped-placeholder="Search"
        autocapitalize="off">
      <input type="hidden" class="js-site-search-type-field" name="type" >
    </label>
  </form></div>
```

```
<a class="text-bold site-header-link" href="/login?return_to=%2Fvt-
middleware%2Fcryptacular%2Fblob%2Fmaster%2FNOTICE" data-ga-click="(Logged out) Header, clicked Sign
in, text:sign-in">Sign in</a>
  <span class="text-gray">or</span>
  <a class="text-bold site-header-link" href="/join?source=header-repo" data-ga-click="(Logged out) Header,
clicked Sign up, text:sign-up">Sign up</a>
</div>
</div>
</div>
</header>
```

```
</div>
```

```
<div id="start-of-content" class="show-on-focus"></div>
```

```
<div id="js-flash-container">  
</div>
```

```
<div role="main">  
  <div itemscope itemtype="http://schema.org/SoftwareSourceCode">  
    <div id="js-repo-pjax-container" data-pjax-container>
```

```
<div class="pagehead repohead instapaper_ignore readability-menu experiment-repo-nav">  
  <div class="container repohead-details-container">
```

```
    <ul class="pagehead-actions">  
      <li>  
        <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"  
          class="btn btn-sm btn-with-count tooltipped tooltipped-n"  
          aria-label="You must be signed in to watch a repository" rel="nofollow">  
          <svg aria-hidden="true" class="octicon octicon-eye" height="16" version="1.1" viewBox="0 0 16 16"  
            width="16"><path fill-rule="evenodd" d="M8.06 2C3 2 0 8 8 8s3 6 8.06 6C13 14 16 8 16 8s-3-6-7.94-6zM8 12c-  
            2.2 0-4-1.78-4-4 0-2.2 1.8-4 4-4 2.2 0 4 1.8 4 4 0 2.2-1.78 4-4 4zm2-4c0 1.11-.89 2-2 2-1.11 0-2-.89-2-2 0-  
            1.11.89-2 2-2 1.11 0 2 .89 2 2z"/></svg>
```

```
          Watch  
</a>  
<a class="social-count" href="/vt-middleware/cryptacular/watchers"  
  aria-label="9 users are watching this repository">  
  9  
</a>
```

```
</li>
```

```
<li>  
  <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"  
    class="btn btn-sm btn-with-count tooltipped tooltipped-n"  
    aria-label="You must be signed in to star a repository" rel="nofollow">  
    <svg aria-hidden="true" class="octicon octicon-star" height="16" version="1.1" viewBox="0 0 14 16"  
      width="14"><path fill-rule="evenodd" d="M14 6l-4.9-.64L7 1 4.9 5.36 0 6l3.6 3.26L2.67 14 7 11.67 11.33 14l-.93-
```

4.74z"/></svg>

Star

15

<a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"

class="btn btn-sm btn-with-count tooltipped tooltipped-n"

aria-label="You must be signed in to fork a repository" rel="nofollow">

<svg aria-hidden="true" class="octicon octicon-repo-forked" height="16" version="1.1" viewBox="0 0 10 16" width="10"><path fill-rule="evenodd" d="M8 1a1.993 1.993 0 0 0 1 3.72V6L5 8 3 6V4.72A1.993 1.993 0 0 0 2 1a1.993 1.993 0 0 0 1 3.72V6.513 3v1.78A1.993 1.993 0 0 0 5 15a1.993 1.993 0 0 0 1 3.72V9.513-3V4.72A1.993 1.993 0 0 0 8 1zM2 4.2C1.34 4.2.8 3.65.8 3c0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3 10c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3-10c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>

Fork

1

<h1 class="public ">

<svg aria-hidden="true" class="octicon octicon-repo" height="16" version="1.1" viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M4 9H3V8h1v1zm0-3H3v1h1V6zm0-2H3v1h1V4zm0-2H3v1h1V2zm8-1v12c0 .55-.45 1-1 1H6v2l-1.5-1.5L3 16v-2H1c-.55 0-1-.45-1-1V1c0-.55.45-1 1-1h10c.55 0 1 .45 1 1zm-1 10H1v2h2v-1h3v1h5v-2zm0-10H2v9h9V1z"/></svg>

vt-middleware<!--

--><!--

--><strong itemprop="name">cryptacular

</h1>

</div>

<div class="container">

<nav class="reponav js-repo-nav js-sidenav-container-pjax"

```

itemscope
itemtype="http://schema.org/BreadcrumbList"
role="navigation"
data-pjax="#js-repo-pjax-container">

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular" class="js-selected-navigation-item selected reponav-item" data-hotkey="g c" data-selected-links="repo_source repo_downloads repo_commits repo_releases repo_tags repo_branches /vt-middleware/cryptacular" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-code" height="16" version="1.1" viewBox="0 0 14 16" width="14"><path fill-rule="evenodd" d="M9.5 3L8 4.5 11.5 8 8 11.5 9.5 13 14 8 9.5 3zm-5 0L0 8 4.5 5L6 11.5 2.5 8 6 4.5 4.5 3z"/></svg>
    <span itemprop="name">Code</span>
    <meta itemprop="position" content="1">
  </a> </span>

  <span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
    <a href="/vt-middleware/cryptacular/issues" class="js-selected-navigation-item reponav-item" data-hotkey="g i" data-selected-links="repo_issues repo_labels repo_milestones /vt-middleware/cryptacular/issues" itemprop="url">
      <svg aria-hidden="true" class="octicon octicon-issue-opened" height="16" version="1.1" viewBox="0 0 14 16" width="14"><path fill-rule="evenodd" d="M7 2.3c3.14 0 5.7 2.56 5.7 5.7s-2.56 5.7-5.7 5.7A5.71 5.71 0 0 1 1.3 8c0-3.14 2.56-5.7 5.7-5.7zm7 1C3.14 1 0 4.14 0 8s3.14 7 7 7-3.14 7-7-7zm1 3H6v5h2V4zm0 6H6v2h2v-2z"/></svg>
      <span itemprop="name">Issues</span>
      <span class="Counter">4</span>
      <meta itemprop="position" content="2">
    </a> </span>

    <span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
      <a href="/vt-middleware/cryptacular/pulls" class="js-selected-navigation-item reponav-item" data-hotkey="g p" data-selected-links="repo_pulls /vt-middleware/cryptacular/pulls" itemprop="url">
        <svg aria-hidden="true" class="octicon octicon-git-pull-request" height="16" version="1.1" viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M11 11.28V5c-.03-.78-.34-1.47-.94-2.06C9.46 2.35 8.78 2.03 8 2H7V0L4 3 3V4h1c.27.02.48.11.69.31.21.2.3.42.31.69v6.28A1.993 1.993 0 0 0 10 15a1.993 1.993 0 0 0 1-3.72zm-1 2.92c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm4 3c0-1.11-.89-2-2-2a1.993 1.993 0 0 0 1-3.72v6.56A1.993 1.993 0 0 0 2 15a1.993 1.993 0 0 0 1-3.72V4.72c.59-.34 1-.98 1-1.72zm-.8 10c0 .66-.55 1.2-1.2 1.2-.65 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2zm2 4.2C1.34 4.2 3.65 8 3c0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
        <span itemprop="name">Pull requests</span>
        <span class="Counter">1</span>
        <meta itemprop="position" content="3">
      </a> </span>

      <a href="/vt-middleware/cryptacular/projects" class="js-selected-navigation-item reponav-item" data-selected-links="repo_projects new_repo_project repo_project /vt-middleware/cryptacular/projects">
        <svg aria-hidden="true" class="octicon octicon-project" height="16" version="1.1" viewBox="0 0 15 16" width="15"><path fill-rule="evenodd" d="M10 12h3V2h-3v10zm-4 2h3V2H6v8zm-4 4h3V2H2v12zm-1 1h13V1H1v14zM14 0H1a1 1 0 0 0 1 1v14a1 1 0 0 0 1 1h13a1 1 0 0 0 1 1V1a1 1 0 0 0 1 1z"/></svg>

```

```

Projects
<span class="Counter" >0</span>
</a>

<div class="reponav-dropdown js-menu-container">
  <button type="button" class="btn-link reponav-item reponav-dropdown js-menu-target " data-no-toggle aria-
expanded="false" aria-haspopup="true">
    Insights
    <svg aria-hidden="true" class="octicon octicon-triangle-down v-align-middle text-gray" height="11"
version="1.1" viewBox="0 0 12 16" width="8"><path fill-rule="evenodd" d="M0 5l6 6 6-6z"/></svg>
  </button>
  <div class="dropdown-menu-content js-menu-content">
    <div class="dropdown-menu dropdown-menu-sw">
      <a class="dropdown-item" href="/vt-middlewre/cryptacular/pulse" data-skip-pjax>
        <svg aria-hidden="true" class="octicon octicon-pulse" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M11.5 8L8.8 5.4 6.6 8.5 5.5 1.6 2.38 8H0v2h3.6l.9-1.8.9 5.4L9 8.5l1.6
1.5H14V8z"/></svg>
        Pulse
      </a>
      <a class="dropdown-item" href="/vt-middlewre/cryptacular/graphs" data-skip-pjax>
        <svg aria-hidden="true" class="octicon octicon-graph" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M16 14v1H0V0h1v14h15zM5 13H3V8h2v5zm4 0H7V3h2v10zm4 0h-
2V6h2v7z"/></svg>
        Graphs
      </a>
    </div>
  </div>
</div>
</nav>

</div>
</div>

<div class="container new-discussion-timeline experiment-repo-nav">
  <div class="repository-content">

  <a href="/vt-middlewre/cryptacular/blob/c26911e3cd28497ce9daa3ce682e09cb2d1d8688/NOTICE" class="d-
none js-permalink-shortcut" data-hotkey="y">Permalink</a>

  <!-- blob contrib key: blob_contributors:v21:f5054b9e46039e0ad937c69e6151b7d4 -->

  <div class="file-navigation js-zeroclipboard-container">

  <div class="select-menu branch-select-menu js-menu-container js-select-menu float-left">
    <button class=" btn btn-sm select-menu-button js-menu-target css-truncate" data-hotkey="w"

```

```

type="button" aria-label="Switch branches or tags" aria-expanded="false" aria-haspopup="true">
  <i>Branch:</i>
  <span class="js-select-button css-truncate-target">master</span>
</button>

<div class="select-menu-modal-holder js-menu-content js-navigation-container" data-pjax>

  <div class="select-menu-modal">
    <div class="select-menu-header">
      <svg aria-label="Close" class="octicon octicon-x js-menu-close" height="16" role="img" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M7.48 8l3.75-1.48 1.48L6 9.48l-3.75 3.75-
1.48-1.48L4.52 8 .77 4.25l1.48-1.48L6 5.25l3.75-1.48 1.48 1.48z"/></svg>
      <span class="select-menu-title">Switch branches/tags</span>
    </div>

    <div class="select-menu-filters">
      <div class="select-menu-text-filter">
        <input type="text" aria-label="Filter branches/tags" id="context-commitish-filter-field" class="form-control
js-filterable-field js-navigation-enable" placeholder="Filter branches/tags">
      </div>
      <div class="select-menu-tabs">
        <ul>
          <li class="select-menu-tab">
            <a href="#" data-tab-filter="branches" data-filter-placeholder="Filter branches/tags" class="js-select-menu-
tab" role="tab">Branches</a>
          </li>
          <li class="select-menu-tab">
            <a href="#" data-tab-filter="tags" data-filter-placeholder="Find a tag" class="js-select-menu-tab"
role="tab">Tags</a>
          </li>
        </ul>
      </div>
    </div>

    <div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="branches"
role="menu">

      <div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

        <a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/blob/ISSUE-31+32/NOTICE"
data-name="ISSUE-31+32"
data-skip-pjax="true"
rel="nofollow">
          <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 4 4 1.5-1.5L4 10l6.5-6.5z"/></svg>
          <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">

```

ISSUE-31+32

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/blob/gh-pages/NOTICE"
data-name="gh-pages"
data-skip-pjax="true"
rel="nofollow">

<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

gh-pages

<a class="select-menu-item js-navigation-item js-navigation-open selected"
href="/vt-middleware/cryptacular/blob/master/NOTICE"
data-name="master"
data-skip-pjax="true"
rel="nofollow">

<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

master

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/blob/v1.1/NOTICE"
data-name="v1.1"
data-skip-pjax="true"
rel="nofollow">

<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

v1.1

</div>

<div class="select-menu-no-results">Nothing to show</div>

</div>

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="tags">

<div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.2.1/NOTICE"
data-name="v1.2.1"

```

data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.2.1">
    v1.2.1
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.2.0/NOTICE"
data-name="v1.2.0"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.2.0">
    v1.2.0
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.2/NOTICE"
data-name="v1.1.2"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.1.2">
    v1.1.2
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.1/NOTICE"
data-name="v1.1.1"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.1.1">
    v1.1.1
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.0/NOTICE"
data-name="v1.1.0"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

```



```

    <span class="select-menu-item-text css-truncate-target" title="v1.1.0">
      v1.1.0
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0/NOTICE"
    data-name="v1.0"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0">
      v1.0
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0-RC6/NOTICE"
    data-name="v1.0-RC6"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0-RC6">
      v1.0-RC6
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0-RC4/NOTICE"
    data-name="v1.0-RC4"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0-RC4">
      v1.0-RC4
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0-RC3/NOTICE"
    data-name="v1.0-RC3"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0-RC3">
      v1.0-RC3
    </span>
  </a>

```

```

<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middlewre/cryptacular/tree/v1.0-RC2/NOTICE"
  data-name="v1.0-RC2"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC2">
    v1.0-RC2
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middlewre/cryptacular/tree/v1.0-RC1/NOTICE"
  data-name="v1.0-RC1"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC1">
    v1.0-RC1
  </span>
</a>
</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

</div>
</div>
</div>

<div class="BtnGroup float-right">
  <a href="/vt-middlewre/cryptacular/find/master"
    class="js-pjax-capture-input btn btn-sm BtnGroup-item"
    data-pjax
    data-hotkey="t">
    Find file
  </a>
  <button aria-label="Copy file path to clipboard" class="js-zeroclipboard btn btn-sm BtnGroup-item tooltiped
  tooltiped-s" data-copied-hint="Copied!" type="button">Copy path</button>
</div>
<div class="breadcrumb js-zeroclipboard-target">
  <span class="repo-root js-repo-root"><span class="js-path-segment"><a href="/vt-
  middlewre/cryptacular"><span>cryptacular</span></a></span></span><span class="separator"></span><strong
  class="final-path">NOTICE</strong>
</div>
</div>

```

```

<div class="commit-tease">
  <span class="float-right">
    <a class="commit-tease-sha" href="/vt-
middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1" data-pjax>
      6dd6f19
    </a>
    <relative-time datetime="2017-07-06T22:28:36Z">Jul 7, 2017</relative-time>
  </span>
  <div>
    
    <a href="/dfish3r" class="user-mention" rel="contributor">dfish3r</a>
    <a href="/vt-middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1"
class="message" data-pjax="true" title="Update year in notice.">Update year in notice.</a>
  </div>

<div class="commit-tease-contributors">
  <button type="button" class="btn-link muted-link contributors-toggle" data-facebox="#blob_contributors_box">
    <strong>1</strong>
    contributor
  </button>

</div>

<div id="blob_contributors_box" style="display:none">
  <h2 class="facebox-header" data-facebox-id="facebox-header">Users who have contributed to this file</h2>
  <ul class="facebox-user-list" data-facebox-id="facebox-description">
    <li class="facebox-user-list-item">
      
      <a href="/dfish3r">dfish3r</a>
    </li>
  </ul>
</div>
</div>

<div class="file">
  <div class="file-header">
  <div class="file-actions">

  <div class="BtnGroup">
    <a href="/vt-middleware/cryptacular/raw/master/NOTICE" class="btn btn-sm BtnGroup-item" id="raw-
url">Raw</a>
    <a href="/vt-middleware/cryptacular/blame/master/NOTICE" class="btn btn-sm js-update-url-with-hash
BtnGroup-item" data-hotkey="b">Blame</a>
    <a href="/vt-middleware/cryptacular/commits/master/NOTICE" class="btn btn-sm BtnGroup-item"

```

```
rel="nofollow">History</a>
```

```
</div>
```

```
<button type="button" class="btn-octicon disabled tooltiped tooltiped-nw"
  aria-label="You must be signed in to make or propose changes">
  <svg aria-hidden="true" class="octicon octicon-pencil" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M0 12v3h3l8-8-3-3-8 8zm3 2H1v-2h1v1h1v1zm10.3-9.3L12 6 9 3l1.3-
1.3a.996.996 0 0 1 1.41 0l1.59 1.59c.39.39.39 1.02 0 1.41z"/></svg>
```

```
</button>
```

```
<button type="button" class="btn-octicon btn-octicon-danger disabled tooltiped tooltiped-nw"
  aria-label="You must be signed in to make or propose changes">
  <svg aria-hidden="true" class="octicon octicon-trashcan" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M11 2H9c0-.55-.45-1-1-1H5c-.55 0-.45-1 1H2c-.55 0-.45-1 1v1c0
.55.45 1 1 1v9c0 .55.45 1 1 1h7c.55 0 1-.45 1-1V5c.55 0 1-.45 1-1V3c0-.55-.45-1-1-1zm-1
12H3V5h1v8h1V5h1v8h1V5h1v8h1V5h1v9zm1-10H2V3h9v1z"/></svg>
```

```
</button>
```

```
</div>
```

```
<div class="file-info">
```

```
  7 lines (5 sloc)
```

```
  <span class="file-info-divider"></span>
```

```
  165 Bytes
```

```
</div>
```

```
</div>
```

```
<div itemprop="text" class="blob-wrapper data type-text">
```

```
  <table class="highlight tab-size js-file-line-container" data-tab-size="8">
```

```
    <tr>
```

```
      <td id="L1" class="blob-num js-line-number" data-line-number="1"></td>
```

```
      <td id="LC1" class="blob-code blob-code-inner js-file-line">Cryptacular Java Library</td>
```

```
    </tr>
```

```
    <tr>
```

```
      <td id="L2" class="blob-num js-line-number" data-line-number="2"></td>
```

```
      <td id="LC2" class="blob-code blob-code-inner js-file-line">Copyright (C) 2003-2017 Virginia Tech.</td>
```

```
    </tr>
```

```
    <tr>
```

```
      <td id="L3" class="blob-num js-line-number" data-line-number="3"></td>
```

```
      <td id="LC3" class="blob-code blob-code-inner js-file-line">All rights reserved.</td>
```

```
    </tr>
```

```
    <tr>
```

```
      <td id="L4" class="blob-num js-line-number" data-line-number="4"></td>
```

```
      <td id="LC4" class="blob-code blob-code-inner js-file-line">
```

```
</td>
```

```
</tr>
```

```
<tr>
```

```

    <td id="L5" class="blob-num js-line-number" data-line-number="5"></td>
    <td id="LC5" class="blob-code blob-code-inner js-file-line">This product includes software developed at</td>
</tr>
<tr>
    <td id="L6" class="blob-num js-line-number" data-line-number="6"></td>
    <td id="LC6" class="blob-code blob-code-inner js-file-line">Virginia Tech (http://www.vt.edu).</td>
</tr>
</table>

</div>

</div>

<button type="button" data-facebox="#jump-to-line" data-facebox-class="linejump" data-hotkey="l" class="d-
none">Jump to Line</button>
<div id="jump-to-line" style="display:none">
    <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="" class="js-jump-
to-line-form" method="get"><div style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden"
value="#x2713;" /></div>
    <input class="form-control linejump-input js-jump-to-line-field" type="text" placeholder="Jump to line&hellip;"
aria-label="Jump to line" autofocus>
    <button type="submit" class="btn">Go</button>
</form> </div>

</div>
<div class="modal-backdrop js-touch-events"></div>
</div>

</div>
</div>

</div>

<div class="container site-footer-container">
<div class="site-footer " role="contentinfo">
    <ul class="site-footer-links float-right">
        <li><a href="https://github.com/contact" data-ga-click="Footer, go to contact, text:contact">Contact
GitHub</a></li>
        <li><a href="https://developer.github.com" data-ga-click="Footer, go to api, text:api">API</a></li>
        <li><a href="https://training.github.com" data-ga-click="Footer, go to training, text:training">Training</a></li>
        <li><a href="https://shop.github.com" data-ga-click="Footer, go to shop, text:shop">Shop</a></li>
        <li><a href="https://github.com/blog" data-ga-click="Footer, go to blog, text:blog">Blog</a></li>
        <li><a href="https://github.com/about" data-ga-click="Footer, go to about, text:about">About</a></li>
    </ul>

```

```
<a href="https://github.com" aria-label="Homepage" class="site-footer-mark" title="GitHub">
  <svg aria-hidden="true" class="octicon octicon-mark-github" height="24" version="1.1" viewBox="0 0 16 16"
width="24"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59.47.55 1.17 1.08 1.88
.19-.01-.82-.01-1.49-.2.01-.37-.25-.49-.26-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53.63-.01 1.08.58
1.23.82.72 1.21 1.87.87 2.33.66.07-.52.28-.87.51-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87.31-1.59.82-2.15-.08-.2-.36-
1.02.08-2.12 0 0 .67-.21 2.28-.64-.18 1.32-.27 2-.27.68 0 1.36.09 2 .27 1.53-1.04 2.2-.82 2.2-.82.44 1.1.16 1.92.08
2.12.51.56.82 1.27.82 2.15 0 3.07-1.87 3.75-3.65 3.95.29.25.54.73.54 1.48 0 1.07-.01 1.93-.01 2.2 0
.21.15.46.55.38A8.013 8.013 0 0 0 16 8c0-4.42-3.58-8-8-8z"/></svg>
</a>
<ul class="site-footer-links">
  <li>&copy; 2017 <span title="0.10938s from unicorn-2925809464-f2ltq">GitHub</span>, Inc.</li>
  <li><a href="https://github.com/site/terms" data-ga-click="Footer, go to terms, text:terms">Terms</a></li>
  <li><a href="https://github.com/site/privacy" data-ga-click="Footer, go to privacy,
text:privacy">Privacy</a></li>
  <li><a href="https://github.com/security" data-ga-click="Footer, go to security,
text:security">Security</a></li>
  <li><a href="https://status.github.com/" data-ga-click="Footer, go to status, text:status">Status</a></li>
  <li><a href="https://help.github.com" data-ga-click="Footer, go to help, text:help">Help</a></li>
</ul>
</div>
</div>
```

```
<div id="ajax-error-message" class="ajax-error-message flash flash-error">
  <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-
.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-
2V6h2v4z"/></svg>
  <button type="button" class="flash-close js-flash-close js-ajax-error-dismiss" aria-label="Dismiss error">
    <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77
4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
  </button>
  You can't perform that action at this time.
</div>
```

```
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/compat-
91f98c37fc84eac24836eac2567e9912742094369a04c4eba6e3cd1fa18902d9.js"></script>
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/frameworks-
f84bb87b149685d1e6c6f057ee324f2cd496e677f5a359a8b5db853313bb83e6.js"></script>

<script async="async" crossorigin="anonymous" src="https://assets-cdn.github.com/assets/github-
13fa3aa50ac8f9fa9a7d198f0cd13b0905775d39446ad076d17d8f74a998438a.js"></script>
```

```

<div class="js-stale-session-flash stale-session-flash flash flash-warn flash-banner d-none">
  <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-
.18.69 0 1.19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-
2V6h2v4z"/></svg>
  <span class="signed-in-tab-flash">You signed in with another tab or window. <a href="">Reload</a> to refresh
your session.</span>
  <span class="signed-out-tab-flash">You signed out in another tab or window. <a href="">Reload</a> to refresh
your session.</span>
</div>
<div class="facebox" id="facebox" style="display:none;">
<div class="facebox-popup">
  <div class="facebox-content" role="dialog" aria-labelledby="facebox-header" aria-describedby="facebox-
description">
  </div>
  <button type="button" class="facebox-close js-facebox-close" aria-label="Close modal">
  <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77
4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
  </button>
</div>
</div>

```

```
</body>
```

```
</html>
```

```
/*
```

```
* Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
```

```
* or more contributor license agreements. Licensed under the Elastic License;
```

```
* you may not use this file except in compliance with the Elastic License.
```

```
*/
```

```
package org.elasticsearch.xpack.security.authz.permission;
```

```
import org.elasticsearch.action.get.GetAction;
```

```
import org.elasticsearch.test.ESTestCase;
```

```
import org.elasticsearch.xpack.core.security.authz.permission.Role;
```

```
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
```

```
import org.junit.Before;
```

```
import java.util.function.Predicate;
```

```
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.MONITOR;
```

```
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.READ;
```

```
import static org.hamcrest.Matchers.is;
```

```
import static org.hamcrest.Matchers.notNullValue;
```

```
public class PermissionTests extends ESTestCase {
```

```

private Role permission;

@Before
public void init() {
    Role.Builder builder = Role.builder("test");
    builder.add(MONITOR, "test_*", "/foo.*");
    builder.add(READ, "baz_*foo", "/fool.*bar/");
    builder.add(MONITOR, "/bar.*");
    permission = builder.build();
}

public void testAllowedIndicesMatcherAction() throws Exception {
    testAllowedIndicesMatcher(permission.indices().allowedIndicesMatcher(GetAction.NAME));
}

public void testAllowedIndicesMatcherActionCaching() throws Exception {
    Predicate<String> matcher1 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
    Predicate<String> matcher2 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
    assertThat(matcher1, is(matcher2));
}

public void testBuildEmptyRole() {
    Role.Builder permission = Role.builder(new String[] { "some_role" });
    Role role = permission.build();
    assertThat(role, notNullValue());
    assertThat(role.cluster(), notNullValue());
    assertThat(role.indices(), notNullValue());
    assertThat(role.runAs(), notNullValue());
}

public void testRunAs() {
    Role permission = Role.builder("some_role")
        .runAs(new Privilege("name", "user1", "run*"))
        .build();
    assertThat(permission.runAs().check("user1"), is(true));
    assertThat(permission.runAs().check("user"), is(false));
    assertThat(permission.runAs().check("run" + randomAlphaOfLengthBetween(1, 10)), is(true));
}

// "baz_*foo", "/fool.*bar/"
private void testAllowedIndicesMatcher(Predicate<String> indicesMatcher) {
    assertThat(indicesMatcher.test("foobar"), is(false));
    assertThat(indicesMatcher.test("fool"), is(false));
    assertThat(indicesMatcher.test("fool2bar"), is(true));
    assertThat(indicesMatcher.test("baz_foo"), is(true));
    assertThat(indicesMatcher.test("barbapapa"), is(false));
}
}

```



```

/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissions;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReferenceArray;

import static org.hamcrest.Matchers.containsString;

public class FieldPermissionsTests extends ESTestCase {

    public void testParseFieldPermissions() throws Exception {
        String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
            \"field_security\": { \" +
            \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"], \" +
            \"except\": [\"f3\", \"f4\"] \" +
            \"}}}]";
        RoleDescriptor rd =
            RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
        assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
            new String[] { "f1", "f2", "f3", "f4" });
        assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
            new String[] { "f3", "f4" });

        q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
            \"field_security\": { \" +
            \"except\": [\"f3\", \"f4\"], \" +
            \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"] \" +
            \"}}}]";
        rd = RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
        assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
            new String[] { "f1", "f2", "f3", "f4" });
        assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),

```

```

    new String[] { "f3", "f4" });

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": { \" +
    \"grant\": [\"f1\", \"f2\"] \" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
    new String[] { "f1", "f2" });
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": { \" +
    \"grant\": [] \" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": { \" +
    \"except\": [], \" +
    \"grant\": [] \" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(), new String[] {});

final String exceptWithoutGrant = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    [\"p3\"], \"field_security\": { \" +
    \"except\": [\"f1\"] \" +
    \"}}}]";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptWithoutGrant), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),
    containsString("failed to parse indices privileges for role [test]. field_security"
        + " requires grant if except is given"));

final String grantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": { \" +
    \"grant\": null \" +
    \"}}}]";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(grantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for \" +
    \" role [test]. grant must not be null."));

```

```

final String exceptNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"p3\", \"field_security\": {\" +
    \"grant\": [\"*\"],\" +
    \"except\": null\" +
    \"}]}]";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),
    containsString("failed to parse indices privileges for role [test]. except must\" +
        \" not be null.\"));

final String exceptGrantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"p3\", \"field_security\": {\" +
    \"grant\": null,\" +
    \"except\": null\" +
    \"}]}]";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptGrantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges \" +
    \"for role [test]. grant must not be null.\"));

final String bothFieldsMissing = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"p3\", \"field_security\": {\" +
    \"}]}]";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(bothFieldsMissing), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges \" +
    \"for role [test]. \"field_security\" must not be empty.\"));

// try with two indices and mix order a little
q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\", \" +
    \"field_security\": {\" +
    \"grant\": []\" +
    \"}},\" +
    \"{\"names\": \"idx3\",\\n\" +
    \"field_security\": {\\n\" +
    \"grant\": [\"*\"], \\n\" +
    \"except\": [\"f2\"]},\" +
    \"privileges\": [\"p3\"]}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
assertArrayEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"*"});
assertArrayEquals(rd.getIndicesPrivileges()[1].getDeniedFields(), new String[] {"f2"});

```

```

}

// test old syntax for field permissions
public void testBWCFIELDPermissions() throws Exception {
    String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": [\"f1\", \"f2\"]\" +
        \"}}\"";
    RoleDescriptor rd = RoleDescriptor.parse("test", new ByteArray(q), true,
        XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[]{"f1", "f2"});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

    final String failingQuery = q;
    ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": []\" +
        \"}}\"";
    rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[]{});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
    final String failingQuery2 = q;
    e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery2), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": null\" +
        \"}}\"";
    rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
    assertNull(rd.getIndicesPrivileges()[0].getGrantedFields());
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
    final String failingQuery3 = q;
    e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery3), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

```

```

}

public void testFieldPermissionsHashCodeThreadSafe() throws Exception {
    final int numThreads = scaledRandomIntBetween(4, 16);
    final FieldPermissions fieldPermissions =new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "*" }, new String[] { "foo" }));
    final CountdownLatch latch = new CountdownLatch(numThreads + 1);
    final AtomicReferenceArray<Integer> hashCodes = new AtomicReferenceArray<>(numThreads);
    List<Thread> threads = new ArrayList<>(numThreads);
    for (int i = 0; i < numThreads; i++) {
        final int threadNum = i;
        threads.add(new Thread() -> {
            latch.countDown();
            try {
                latch.await();
            } catch (InterruptedException e) {
                Thread.currentThread().interrupt();
            }
            final int hashCode = fieldPermissions.hashCode();
            hashCodes.set(threadNum, hashCode);
        });
    }

    for (Thread thread : threads) {
        thread.start();
    }
    latch.countDown();
    for (Thread thread : threads) {
        thread.join();
    }

    final int hashCode = fieldPermissions.hashCode();
    for (int i = 0; i < numThreads; i++) {
        assertEquals((Integer) hashCode, hashCodes.get(i));
    }
}

public void testAllFieldIsAutomaticallyExcludedIfNotExplicitlyGranted() throws Exception {
    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "_a*" }, new String[0]));
    assertTrue(fieldPermissions.grantsAccessTo("_animal"));
    assertFalse(fieldPermissions.grantsAccessTo("_all"));
}

public void testAllFieldIsNotExcludedIfExplicitlyGranted() throws Exception {
    final String[] grant = { "foo", "bar", "baz", "_all" };
    Collections.shuffle(Arrays.asList(grant), random());
}

```

```

final FieldPermissions fieldPermissions = new FieldPermissions(
    new FieldPermissionsDefinition(grant, new String[0]));

assertTrue(fieldPermissions.grantsAccessTo("_all"));
assertTrue(fieldPermissions.grantsAccessTo("foo"));
assertTrue(fieldPermissions.grantsAccessTo("bar"));
assertTrue(fieldPermissions.grantsAccessTo("baz"));
assertFalse(fieldPermissions.grantsAccessTo(randomAlphaOfLengthBetween(5, 8)));
}
}
/*
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 */
package org.elasticsearch.license;

import org.apache.http.message.BasicHeader;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.DocWriteResponse;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.stats.NodesStatsResponse;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsIndices;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsResponse;
import org.elasticsearch.action.admin.indices.stats.IndicesStatsResponse;
import org.elasticsearch.action.index.IndexResponse;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.transport.NoNodeAvailableException;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.routing.ShardRoutingState;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.SecureString;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.util.concurrent.ThreadContext;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.SecurityIntegTestCase;
import org.elasticsearch.test.SecuritySettingsSource;
import org.elasticsearch.test.SecuritySettingsSourceField;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.transport.Transport;

```

```

import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.security.SecurityField;
import org.elasticsearch.xpack.core.security.action.user.GetUsersResponse;
import org.elasticsearch.xpack.core.security.authc.support.UsernamePasswordToken;
import org.elasticsearch.xpack.core.security.client.SecurityClient;
import org.elasticsearch.xpack.security.LocalStateSecurity;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertNoFailures;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.greaterThanOrEqualTo;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

@TestLogging("org.elasticsearch.cluster.service:TRACE,org.elasticsearch.discovery.zen:TRACE,org.elasticsearch.
action.search:TRACE," +
    "org.elasticsearch.search:TRACE")
public class LicensingTests extends SecurityIntegTestCase {
    public static final String ROLES =
        SecuritySettingsSource.TEST_ROLE + ":\n" +
            " cluster: [ all ]\n" +
            " indices:\n" +
            "   - names: '*'\n" +
            "   privileges: [manage]\n" +
            "   - names: '/*'\n" +
            "   privileges: [write]\n" +
            "   - names: 'test'\n" +
            "   privileges: [read]\n" +
            "   - names: 'test1'\n" +
            "   privileges: [read]\n" +
            "\n" +
            "role_a:\n" +
            " indices:\n" +
            "   - names: 'a'\n" +
            "   privileges: [all]\n" +
            "\n" +
            "role_b:\n" +
            " indices:\n" +

```

```

        " - names: 'b\\n" +
        "   privileges: [all]\\n";

public static final String USERS =
    SecuritySettingsSource.CONFIG_STANDARD_USER +
    "user_a:{plain}passwd\\n" +
    "user_b:{plain}passwd\\n";

public static final String USERS_ROLES =
    SecuritySettingsSource.CONFIG_STANDARD_USER_ROLES +
    "role_a:user_a,user_b\\n" +
    "role_b:user_b\\n";

@Override
protected String configRoles() {
    return ROLES;
}

@Override
protected String configUsers() {
    return USERS;
}

@Override
protected String configUsersRoles() {
    return USERS_ROLES;
}

@Override
public Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder().put(super.nodeSettings(nodeOrdinal))
        .put(NetworkModule.HTTP_ENABLED.getKey(), true)
        .put(TestZenDiscovery.USE MOCK_PINGS.getKey(), false)
        .build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(Netty4Plugin.class); // for http
    return plugins;
}

@Override
protected int maxNumberOfNodes() {
    return super.maxNumberOfNodes() + 1;
}

```



```

@Before
public void resetLicensing() {
    enableLicensing();
}

@After
public void cleanupSecurityIndex() {
    deleteSecurityIndex();
}

public void testEnableDisableBehaviour() throws Exception {
    IndexResponse indexResponse = index("test", "type", jsonBuilder()
        .startObject()
        .field("name", "value")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    indexResponse = index("test1", "type", jsonBuilder()
        .startObject()
        .field("name", "value1")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    refresh();
    // wait for all replicas to be started (to make sure that there are no more cluster state updates when we disable
licensing)
    assertBusy(() -> assertTrue(client().admin().cluster().prepareState().get().getState().routingTable()
        .shardsWithState(ShardRoutingState.INITIALIZING).isEmpty()));

    Client client = internalCluster().transportClient();

    disableLicensing();

    assertElasticsearchSecurityException(() -> client.admin().indices().prepareStats().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareClusterStats().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareHealth().get());
    assertElasticsearchSecurityException(() -> client.admin().cluster().prepareNodesStats().get());

    enableLicensing(randomFrom(License.OperationMode.values()));

    IndicesStatsResponse indicesStatsResponse = client.admin().indices().prepareStats().get();
    assertNoFailures(indicesStatsResponse);

    ClusterStatsResponse clusterStatsNodeResponse = client.admin().cluster().prepareClusterStats().get();
    assertThat(clusterStatsNodeResponse, notNullValue());
    ClusterStatsIndices indices = clusterStatsNodeResponse.getIndicesStats();
    assertThat(indices, notNullValue());

```

```

assertThat(indices.getIndexCount(), greaterThanOrEqualTo(2));

ClusterHealthResponse clusterIndexHealth = client.admin().cluster().prepareHealth().get();
assertThat(clusterIndexHealth, notNullValue());

NodesStatsResponse nodeStats = client.admin().cluster().prepareNodesStats().get();
assertThat(nodeStats, notNullValue());
}

public void testRestAuthenticationByLicenseType() throws Exception {
    Response response = getRestClient().performRequest("GET", "/");
    // the default of the licensing tests is basic
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    ResponseException e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(403));

    // generate a new license with a mode that enables auth
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    e = expectThrows(ResponseException.class, () -> getRestClient().performRequest("GET", "/"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));
    e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));

    final String basicAuthValue =
UsernamePasswordToken.basicAuthHeaderValue(SecuritySettingsSource.TEST_USER_NAME,
        new SecureString(SecuritySettingsSourceField.TEST_PASSWORD.toCharArray()));
    response = getRestClient().performRequest("GET", "/", new BasicHeader("Authorization", basicAuthValue));
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    response = getRestClient().performRequest("GET", "/_xpack/security/_authenticate",
        new BasicHeader("Authorization", basicAuthValue));
    assertThat(response.getStatusLine().getStatusCode(), is(200));
}

public void testSecurityActionsByLicenseType() throws Exception {
    // security actions should not work!
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        new SecurityClient(client).prepareGetUsers().get();
        fail("security actions should not be enabled!");
    } catch (ElasticsearchSecurityException e) {

```

```

        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
    }

    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    // security actions should not work!
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        GetUsersResponse response = new SecurityClient(client).prepareGetUsers().get();
        assertNotNull(response);
    }
}

public void testTransportClientAuthenticationByLicenseType() throws Exception {
    Settings.Builder builder = Settings.builder()
        .put(internalCluster().transportClient().settings());
    // remove user info
    builder.remove(SecurityField.USER_SETTING.getKey());
    builder.remove(ThreadContext.PREFIX + "." + UsernamePasswordToken.BASIC_AUTH_HEADER);

    // basic has no auth
    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        assertGreenClusterState(client);
    }

    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        client.admin().cluster().prepareHealth().get();
        fail("should not have been able to connect to a node!");
    } catch (NoNodeAvailableException e) {
        // expected
    }
}

```

```

public void testNodeJoinWithoutSecurityExplicitlyEnabled() throws Exception {
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    ensureGreen();

    Path home = createTempDir();
    Path conf = home.resolve("config");
    Files.createDirectories(conf);
    Settings nodeSettings = Settings.builder()
        .put(nodeSettings(maxNumberOfNodes() - 1).filter(s -> "xpack.security.enabled".equals(s) == false))
        .put("node.name", "my-test-node")
        .put("network.host", "localhost")
        .put("cluster.name", internalCluster().getClusterName())
        .put("discovery.zen.minimum_master_nodes",
            internalCluster().getInstance(Settings.class).get("discovery.zen.minimum_master_nodes"))
        .put("path.home", home)
        .put(TestZenDiscovery.USE MOCK PINGS.getKey(), false)
        .put(DiscoveryModule.DISCOVERY_TYPE_SETTING.getKey(), "test-zen")
        .put(DiscoveryModule.DISCOVERY_HOSTS_PROVIDER_SETTING.getKey(), "test-zen")
        .build();
    Collection<Class<? extends Plugin>> mockPlugins = Arrays.asList(LocalStateSecurity.class,
TestZenDiscovery.TestPlugin.class);
    try (Node node = new MockNode(nodeSettings, mockPlugins)) {
        node.start();
        ensureStableCluster(cluster().size() + 1);
    }
}

private static void assertElasticsearchSecurityException(ThrowingRunnable runnable) {
    ElasticsearchSecurityException ee = expectThrows(ElasticsearchSecurityException.class, runnable);
    assertThat(ee.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.SECURITY));
    assertThat(ee.status(), is(RestStatus.FORBIDDEN));
}

public static void disableLicensing() {
    disableLicensing(License.OperationMode.BASIC);
}

public static void disableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, false, null);
    }
}

public static void enableLicensing() {
    enableLicensing(License.OperationMode.BASIC);
}

```

```

}

public static void enableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, true, null);
    }
}
}
}

```

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It is currently developed by a community of developers, as well as supported

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[role="xpack"]

[testenv="basic"]

[[delete-license]]

=== Delete License API

This API enables you to delete licensing information.

[float]

==== Request

```
`DELETE /_xpack/license`
```

[float]

==== Description

When your license expires, {xpack} operates in a degraded mode. For more information, see {xpack-ref}/license-expiration.html[License Expiration].

[float]

==== Authorization

You must have ``manage`` cluster privileges to use this API.

For more information, see

{xpack-ref}/security-privileges.html[Security Privileges].

[float]

==== Examples

The following example queries the info API:

[source,js]

```
-----  
DELETE _xpack/license  
-----
```

```
// CONSOLE
```

```
// TEST[skip:license testing issues]
```

When the license is successfully deleted, the API returns the following response:

[source,js]

```
-----  
{  
  "acknowledged": true  
}
```

```
-----  
// NOTCONSOLE  
[role="xpack"]  
[testenv="basic"]  
[[get-license]]  
=== Get License API
```

This API enables you to retrieve licensing information.

```
[float]  
==== Request
```

```
`GET /_xpack/license`
```

```
[float]  
==== Description
```

This API returns information about the type of license, when it was issued, and when it expires, for example.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

```
[float]  
==== Query Parameters
```

```
`local`:  
(boolean) Specifies whether to retrieve local information. The default value is `false`, which means the information is retrieved from the master node.
```

```
[float]  
==== Authorization
```

You must have `monitor` cluster privileges to use this API.

For more information, see [{xpack-ref}/security-privileges.html](#) [Security Privileges].

```
[float]  
==== Examples
```

The following example provides information about a basic license:

```
[source,js]  
-----  
GET _xpack/license
```



```
-----  
// CONSOLE
```

```
[source.js]
```

```
-----  
{  
  "license" : {  
    "status" : "active",  
    "uid" : "cbff45e7-c553-41f7-ae4f-9205eabd80xx",  
    "type" : "basic",  
    "issue_date" : "2018-02-22T23:12:05.550Z",  
    "issue_date_in_millis" : 1519341125550,  
    "max_nodes" : 1000,  
    "issued_to" : "test",  
    "issuer" : "elasticsearch",  
    "start_date_in_millis" : -1  
  }  
}
```

```
-----  
// TESTRESPONSE[s/"cbff45e7-c553-41f7-ae4f-9205eabd80xx"/$body.license.uid/  
// TESTRESPONSE[s/"basic"/$body.license.type/  
// TESTRESPONSE[s/"2018-02-22T23:12:05.550Z"/$body.license.issue_date/  
// TESTRESPONSE[s/1519341125550/$body.license.issue_date_in_millis/  
// TESTRESPONSE[s/1000/$body.license.max_nodes/  
// TESTRESPONSE[s/"test"/$body.license.issued_to/  
// TESTRESPONSE[s/"elasticsearch"/$body.license.issuer/  
[role="xpack"]  
[testenv="basic"]  
[[update-license]]  
=== Update License API
```

This API enables you to update your license.

```
[float]  
==== Request
```

```
`PUT _xpack/license`
```

```
[float]  
==== Description
```

You can update your license at runtime without shutting down your nodes. License updates take effect immediately. If the license you are installing does not support all of the features that were available with your previous license, however, you are notified in the response. You must then re-submit the API request with the ``acknowledge`` parameter set to ``true``.

For more information about the different types of licenses, see

<https://www.elastic.co/subscriptions>.

[float]

==== Query Parameters

``acknowledge`::`

(boolean) Specifies whether you acknowledge the license changes. The default value is ``false``.

[float]

==== Request Body

``licenses`::`

(array) A sequence of one or more JSON documents containing the license information.

[float]

==== Authorization

If `{security}` is enabled, you need ``manage`` cluster privileges to install the license.

If `{security}` is enabled and you are installing a gold or platinum license, you must enable TLS on the transport networking layer before you install the license. See <<configuring-tls>>.

[float]

==== Examples

The following example updates to a basic license:

[source.js]

```
-----  
POST _xpack/license  
{  
  "licenses": [  
    {  
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",  
      "type": "basic",  
      "issue_date_in_millis": 1411948800000,  
      "expiry_date_in_millis": 1914278399999,  
      "max_nodes": 1,  
      "issued_to": "issuedTo",  
      "issuer": "issuer",  
      "signature": "xx"  
    }  
  ]  
}
```

```
}  
-----  
// CONSOLE  
// TEST[skip:license testing issues]
```

NOTE: These values are invalid; you must substitute the appropriate content from your license file.

You can alternatively use a `curl` command, for example:

```
[source,js]  
[source,shell]  
-----  
curl -XPUT -u <user> 'http://<host>:<port>/_xpack/license' -H "Content-Type: application/json" -d @license.json  
-----  
// NOTCONSOLE
```

On Windows machine, use the following command:

```
[source,shell]  
-----  
gc .\license.json | Invoke-WebRequest -uri http://<host>:<port>/_xpack/license -Credential elastic -Method Put -  
ContentType "application/json"  
-----
```

In these examples,

- * ``<user>`` is a user ID with the appropriate authority.
- * ``<host>`` is the hostname of the {es} node (`localhost` if executing locally)
- * ``<port>`` is the http port (defaults to `9200`)
- * `license.json` is the license JSON file

NOTE: If your {es} node has SSL enabled on the HTTP interface, you must start your URL with `https://`

If you previously had a license with more features than the basic license, you receive the following response:

```
[source,js]  
-----  
{  
  "acknowledged": false,  
  "license_status": "valid",  
  "acknowledge": {  
    "message": ""This license update requires acknowledgement. To acknowledge the license, please read the  
following messages and update the license again, this time with the "acknowledge=true" parameter:""",  
    "watcher": [  

```

```

    "Watcher will be disabled"
  ],
  "logstash": [
    "Logstash will no longer poll for centrally-managed pipelines"
  ],
  "security": [
    "The following X-Pack security functionality will be disabled: ..." ]
  }
}

```

 // NOTCONSOLE

To complete the update, you must re-submit the API request and set the `acknowledge` parameter to `true`. For example:

[source,js]

```

-----
POST _xpack/license?acknowledge=true
{
  "licenses": [
    {
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",
      "type": "basic",
      "issue_date_in_millis": 1411948800000,
      "expiry_date_in_millis": 1914278399999,
      "max_nodes": 1,
      "issued_to": "issuedTo",
      "issuer": "issuer",
      "signature": "xx"
    }
  ]
}

```

 // CONSOLE
 // TEST[skip:license testing issues]

Alternatively:

[source,sh]

```

-----
curl -XPUT -u elastic 'http://<host>:<port>/_xpack/license?acknowledge=true' -H "Content-Type: application/json"
-d @license.json

```

 // NOTCONSOLE

For more information about the features that are disabled when you downgrade your license, see [{ xpack-ref }/license-expiration.html](#) [License Expiration].

```
[role="xpack"]
[[license-settings]]
=== {xpack} License Settings
++++
<titleabbrev>License Settings</titleabbrev>
++++
```

You can configure this licensing setting in the `elasticsearch.yml` file.

For more information, see

[{xpack-ref}/license-management.html](#)[{xpack} License Management].

```
`xpack.license.self_generated.type`::
```

Set to `basic` (default) to enable basic {xpack} features. +

+

--

If set to `trial`, the self-generated license gives access only to all the features of a x-pack for 30 days. You can later downgrade the cluster to a basic license if needed.

--

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```
// -----
```

```
// Transitive dependencies of this project determined from the
```

```
// maven pom organized by organization.
```

```
// -----
```

Apache Extras for Apache log4j.

From: 'an unknown organization'

- geronimo-jms_1.1_spec org.apache.geronimo.specs:geronimo-jms_1.1_spec:jar:1.0

From: 'Apache Software Foundation' (<http://www.apache.org>)

- Apache Log4j (<http://logging.apache.org/log4j/1.2/>) log4j:log4j:bundle:1.2.17

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The art of simplicity is a puzzle of complexity.

Overview

[YAML](<http://yaml.org>) is a data serialization format designed for human readability and interaction with scripting languages.

SnakeYAML is a YAML processor for the Java Virtual Machine.

SnakeYAML features

- * a **complete** [YAML 1.1 processor](<http://yaml.org/spec/1.1/current.html>). In particular, SnakeYAML can parse all examples from the specification.
- * Unicode support including UTF-8/UTF-16 input/output.
- * high-level API for serializing and deserializing native Java objects.
- * support for all types from the [YAML types repository](<http://yaml.org/type/index.html>).
- * relatively sensible error messages.

Info

- * [Changes](<https://bitbucket.org/asomov/snakeyaml/wiki/Changes>)
- * [Documentation](<https://bitbucket.org/asomov/snakeyaml/wiki/Documentation>)

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* Mercurial DVCS is used to dance with the [source code](<https://bitbucket.org/asomov/snakeyaml/src>).

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Alan Beale <biljir@pobox.com> also deserves special credit as he has, in addition to providing the 12Dicts package and being a major contributor to the ENABLE word list, given me an incredible amount of feedback and created a number of special lists (those found in the Supplement) in order to help improve the overall quality of SCOWL.

The 10 level includes the 1000 most common English words (according to the Moby (TM) Words II [MWords] package), a subset of the 1000 most common words on the Internet (again, according to Moby Words II), and frequently class 16 from Brian Kelk's "UK English Wordlist with Frequency Classification".

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Date: Sat, 08 Jul 2000 20:27:21 +0100
From: Brian Kelk <Brian.Kelk@cl.cam.ac.uk>

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> Wordlist With Frequency Classification" word list as it seems to
> be lacking any copyright notice.

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source. An earlier version of the list resided in a filespace called
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Date: Tue, 11 Jul 2000 19:31:34 +0100

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The 20 level includes frequency classes 7-15 from Brian's word list.

The 35 level includes frequency classes 2-6 and words appearing in at
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The 50 level includes Brian's frequency class 1, words words appearing in at least 5 of 12 of the dictionaries as indicated in the 12Dicts package, and uppercase words in at least 4 of the previous 12 dictionaries. A decent number of proper names is also included: The top 1000 male, female, and Last names from the 1990 Census report; a list of names sent to me by Alan Beale; and a few names that I added myself. Finally a small list of abbreviations not commonly found in other word lists is included.

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The 70 level includes Brian's frequency class 0 and the 74,550 common dictionary words from the MWords package. The common dictionary words, like those from the 12Dicts package, have had all likely inflections added. The 70 level also included the 5desk list from version 4.0 of the 12Dics package which is the public domain.

The 80 level includes the ENABLE word list, all the lists in the ENABLE supplement package (except for ABLE), the "UK Advanced Cryptics Dictionary" (UKACD), the list of signature words in from YAWL package, and the 10,196 places list from the MWords package.

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[role="xpack"]

[[delete-license]]

=== Delete License API

This API enables you to delete licensing information.

[float]

==== Request

```
`DELETE /_xpack/license`
```

[float]

==== Description

When your license expires, {xpack} operates in a degraded mode. For more information, see {xpack-ref}/license-expiration.html[License Expiration].

[float]

==== Authorization

You must have `manage` cluster privileges to use this API.`

For more information, see

{xpack-ref}/security-privileges.html[Security Privileges].

[float]

==== Examples

The following example queries the info API:

[source,js]

```
DELETE _xpack/license
```

```
-----  
// CONSOLE  
// TEST[skip:license testing issues]
```

When the license is successfully deleted, the API returns the following response:

```
[source,js]
```

```
-----  
{  
  "acknowledged": true  
}
```

```
-----  
[role="xpack"]  
[[start-trial]]  
==== Start Trial API
```

This API starts a 30-day trial license.

```
[float]  
===== Request
```

```
`POST _xpack/license/start_trial`
```

```
[float]  
===== Description
```

The `start trial`` API enables you to upgrade from a basic license to a 30-day trial license, which gives access to all `{xpack}` features.

NOTE: You are allowed to initiate a trial license only if your cluster has not already activated a trial license for the current major X-Pack version. For example, if you have already activated a trial for v6.0, you cannot start a new trial until v7.0. You can, however, contact `info@elastic.co`` to request an extended trial license.

To check the status of your trial license, use the following API:
`<<get-trial-status>>`.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

```
===== Authorization
```

You must have `manage`` cluster privileges to use this API.
For more information, see `{xpack-ref}/security-privileges.html[Security Privileges]`.

```
[float]
```

==== Examples

The following example checks whether you are eligible to start a trial:

```
[source.js]
```

```
-----  
GET _xpack/license/start_trial  
-----
```

```
// CONSOLE  
// TEST[skip:license testing issues]
```

Example response:

```
[source.js]
```

```
-----  
{  
  "eligible_to_start_trial": true  
}
```

```
-----  
// NOTCONSOLE
```

The following example starts a 30-day trial license. The `acknowledge` parameter is required as you are initiating a license that will expire.

```
[source.js]
```

```
-----  
POST _xpack/license/start_trial?acknowledge=true  
-----
```

```
// CONSOLE  
// TEST[skip:license testing issues]
```

Example response:

```
[source.js]
```

```
-----  
{  
  "trial_was_started": true,  
  "acknowledged": true  
}
```

```
-----  
// NOTCONSOLE
```

```
[role="xpack"]  
[[get-basic-status]]  
=== Get Basic Status API
```

This API enables you to check the status of your basic license.

```
[float]
```

```
==== Request
```

```
`GET _xpack/license/basic_status`
```

[float]

==== Description

In order to initiate a basic license, you must not currently have a basic license.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

==== Authorization

You must have `monitor`` cluster privileges to use this API.

For more information, see

{xpack-ref}/security-privileges.html[Security Privileges].

[float]

==== Examples

The following example checks whether you are eligible to start a basic:

```
[source,js]
```

```
-----  
GET _xpack/license/basic_status  
-----
```

```
// CONSOLE
```

Example response:

```
[source,js]
```

```
-----  
{  
  "eligible_to_start_basic": true  
}
```

```
-----  
// TESTRESPONSE[s/"eligible_to_start_basic": true/"eligible_to_start_basic": $body.eligible_to_start_basic/]
```

```
[role="xpack"]
```

```
[[get-license]]
```

```
=== Get License API
```

This API enables you to retrieve licensing information.

[float]

==== Request

```
`GET /_xpack/license`
```

[float]

==== Description

This API returns information about the type of license, when it was issued, and when it expires, for example.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

[float]

==== Query Parameters

``local`::`

(boolean) Specifies whether to retrieve local information. The default value is ``false``, which means the information is retrieved from the master node.

[float]

==== Authorization

You must have ``monitor`` cluster privileges to use this API.

For more information, see

[{xpack-ref}/security-privileges.html\[Security Privileges\]](#).

[float]

==== Examples

The following example provides information about a basic license:

[source,js]

```
-----  
GET _xpack/license  
-----
```

```
// CONSOLE
```

[source,js]

```
-----  
{  
  "license": {  
    "status": "active",  
    "uid": "cbff45e7-c553-41f7-ae4f-9205eabd80xx",  
    "type": "trial",  
    "issue_date": "2018-02-22T23:12:05.550Z",  
    "issue_date_in_millis": 1519341125550,  
    "expiry_date": "2018-03-24T23:12:05.550Z",  
    "expiry_date_in_millis": 1521933125550,  
    "max_nodes": 1000,  
  }  
}
```



```

    "issued_to" : "test",
    "issuer" : "elasticsearch",
    "start_date_in_millis" : -1
  }
}
-----
// TESTRESPONSE[s/"cbff45e7-c553-41f7-ae4f-9205eabd80xx"/$body.license.uid/]
// TESTRESPONSE[s/"trial"/$body.license.type/]
// TESTRESPONSE[s/"2018-02-22T23:12:05.550Z"/$body.license.issue_date/]
// TESTRESPONSE[s/1519341125550/$body.license.issue_date_in_millis/]
// TESTRESPONSE[s/"2018-03-24T23:12:05.550Z"/$body.license.expiry_date/]
// TESTRESPONSE[s/1521933125550/$body.license.expiry_date_in_millis/]
// TESTRESPONSE[s/1000/$body.license.max_nodes/]
// TESTRESPONSE[s/"test"/$body.license.issued_to/]
// TESTRESPONSE[s/"elasticsearch"/$body.license.issuer/]
[role="xpack"]
[[get-trial-status]]
=== Get Trial Status API

```

This API enables you to check the status of your trial license.

```

[float]
===== Request

```

```

`GET _xpack/license/trial_status`

```

```

[float]
===== Description

```

If a license is not already registered for the cluster, one is generated when the nodes start. By default, this is a 30-day trial license that gives access to all {xpack} features.

NOTE: You are allowed to initiate a trial license only if your cluster has not already activated a trial license for the current major X-Pack version. For example, if you have already activated a trial for v6.0, you cannot start a new trial until v7.0. You can, however, contact `info@elastic.co` to request an extended trial license.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

```

===== Authorization

```

You must have `monitor` cluster privileges to use this API. For more information, see [Security Privileges]({xpack-ref}/security-privileges.html).

[float]

==== Examples

The following example checks whether you are eligible to start a trial:

[source,js]

```
-----  
GET _xpack/license/trial_status  
-----
```

```
// CONSOLE
```

Example response:

[source,js]

```
-----  
{  
  "eligible_to_start_trial": true  
}
```

```
-----  
// TESTRESPONSE[s/"eligible_to_start_trial": true/"eligible_to_start_trial": $body.eligible_to_start_trial/]
```

```
[role="xpack"]
```

```
[[start-basic]]
```

```
=== Start Basic API
```

This API starts an indefinite basic license.

[float]

==== Request

```
`POST _xpack/license/start_basic`
```

[float]

==== Description

The `start basic`` API enables you to initiate an indefinite basic license, which gives access to all `{ xpack }` basic features. If the basic license does not support all of the features that are available with your current license, however, you are notified in the response. You must then re-submit the API request with the `acknowledge`` parameter set to `true``.

To check the status of your basic license, use the following API:

```
<<get-basic-status>>.
```

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

==== Authorization

You must have `manage`` cluster privileges to use this API.

For more information, see
{xpack-ref}/security-privileges.html[Security Privileges].

[float]
==== Examples

The following example starts a basic license if you do not currently have a license:

```
[source,js]
-----
POST _xpack/license/start_basic
-----
// CONSOLE
// TEST[skip:license testing issues]
```

Example response:

```
[source,js]
-----
{
  "basic_was_started": true,
  "acknowledged": true
}
-----
// NOTCONSOLE
```

The following example starts a basic license if you currently have a license with more features than a basic license. As you are losing features, you must pass the acknowledge parameter:

```
[source,js]
-----
POST _xpack/license/start_basic?acknowledge=true
-----
// CONSOLE
// TEST[skip:license testing issues]
```

Example response:

```
[source,js]
-----
{
  "basic_was_started": true,
  "acknowledged": true
}
-----
// NOTCONSOLE
[role="xpack"]
[[update-license]]
=== Update License API
```

This API enables you to update your license.

[float]

==== Request

`PUT _xpack/license`

[float]

==== Description

You can update your license at runtime without shutting down your nodes. License updates take effect immediately. If the license you are installing does not support all of the features that were available with your previous license, however, you are notified in the response. You must then re-submit the API request with the `acknowledge` parameter set to `true`.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

[float]

==== Query Parameters

`acknowledge`::

(boolean) Specifies whether you acknowledge the license changes. The default value is `false`.

[float]

==== Request Body

`licenses`::

(array) A sequence of one or more JSON documents containing the license information.

[float]

==== Authorization

If {security} is enabled, you need `manage` cluster privileges to install the license.

If {security} is enabled and you are installing a gold or platinum license, you must enable TLS on the transport networking layer before you install the license. See <<configuring-tls>>.

[float]

==== Examples

The following example updates to a basic license:

```
[source,js]
-----
POST _xpack/license
{
  "licenses": [
    {
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",
      "type": "basic",
      "issue_date_in_millis": 1411948800000,
      "expiry_date_in_millis": 1914278399999,
      "max_nodes": 1,
      "issued_to": "issuedTo",
      "issuer": "issuer",
      "signature": "xx"
    }
  ]
}
-----
// CONSOLE
// TEST[skip:license testing issues]
```

NOTE: These values are invalid; you must substitute the appropriate content from your license file.

You can alternatively use a ``curl`` command, for example:

```
[source,js]
[source,shell]
-----
curl -XPUT -u <user> 'http://<host>:<port>/_xpack/license' -H "Content-Type: application/json" -d @license.json
-----
// NOTCONSOLE
```

On Windows machine, use the following command:

```
[source,shell]
-----
gc .\license.json | Invoke-WebRequest -uri http://<host>:<port>/_xpack/license -Credential elastic -Method Put -
ContentType "application/json"
-----
```

In these examples,

- * `<user>` is a user ID with the appropriate authority.
- * `<host>` is the hostname of the {es} node (`localhost`` if executing locally)

* ``<port>`` is the http port (defaults to `9200`)

* ``license.json`` is the license JSON file

NOTE: If your {es} node has SSL enabled on the HTTP interface, you must start your URL with `https://`

If you previously had a license with more features than the basic license, you receive the following response:

[source,js]

```
-----  
{  
  "acknowledged": false,  
  "license_status": "valid",  
  "acknowledge": {  
    "message": """"This license update requires acknowledgement. To acknowledge the license, please read the following messages and update the license again, this time with the "acknowledge=true" parameter:""",  
    "watcher": [  
      "Watcher will be disabled"  
    ],  
    "logstash": [  
      "Logstash will no longer poll for centrally-managed pipelines"  
    ],  
    "security": [  
      "The following X-Pack security functionality will be disabled: ..." ]  
    }  
  }  
}
```

To complete the update, you must re-submit the API request and set the ``acknowledge`` parameter to ``true``. For example:

[source,js]

```
-----  
POST _xpack/license?acknowledge=true  
{  
  "licenses": [  
    {  
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",  
      "type": "basic",  
      "issue_date_in_millis": 1411948800000,  
      "expiry_date_in_millis": 1914278399999,  
      "max_nodes": 1,  
      "issued_to": "issuedTo",  
      "issuer": "issuer",  
      "signature": "xx"  
    }  
  ]  
}
```

```

}
-----
// CONSOLE
// TEST[skip:license testing issues]

Alternatively:

[source,sh]
-----
curl -XPUT -u elastic 'http://<host>:<port>/_xpack/license?acknowledge=true' -H "Content-Type: application/json"
-d @license.json
-----
// NOTCONSOLE

```

For more information about the features that are disabled when you downgrade your license, see [{ xpack-ref }/license-expiration.html](#) [License Expiration].

```

[role="xpack"]
[[license-settings]]
=== { xpack } License Settings
++++
<titleabbrev>License Settings</titleabbrev>
++++

```

You can configure this licensing setting in the `elasticsearch.yml` file.

For more information, see

[{ xpack-ref }/license-management.html](#) [{ xpack } License Management].

```

`xpack.license.self_generated.type`::
Set to `basic` (default) to enable basic { xpack } features. +
+
--

```

If set to `trial`, the self-generated license gives access only to all the features of a x-pack for 30 days. You can later downgrade the cluster to a basic license if needed.

```

--
Elasticsearch X-Pack
Copyright 2009-2017 Elasticsearch
apply plugin: 'elasticsearch.build'

```

```

dependencies {
    compile project(xpackModule('core'))
    compile "org.elasticsearch:elasticsearch:${version}"
    testCompile "org.elasticsearch.test:framework:${version}"
}

```

```

project.forbiddenPatterns {
    exclude '**/*.key'
}

```

```

dependencyLicenses.enabled = false

task buildZip(type: Zip, dependsOn: jar) {
    String parentDir = "license-tools-${version}"
    into(parentDir + '/lib') {
        from jar
        from configurations.runtime
    }
    into(parentDir + '/bin') {
        from 'bin'
    }
}

assemble.dependsOn buildZip
0"0
 *H
0
+5Bj:h$Tfsr&avDgpi]2oR<Cizzz E(yhZ}TCjh~!P|499cq5b!Y{VX=,Vd ;g9hD`Xv8n|i) 34aYfsWBkuOo@
u@175/YmI4~
es.logger.level=INFO
log4j.rootLogger=${es.logger.level}, out

log4j.logger.org.apache.http=INFO, out
log4j.additivity.org.apache.http=false

log4j.logger.org.elasticsearch.license=TRACE

log4j.appender.out=org.apache.log4j.ConsoleAppender
log4j.appender.out.layout=org.apache.log4j.PatternLayout
log4j.appender.out.layout.conversionPattern=[%d{ISO8601}][%-5p][%-25c] %m%n
d&^w t<q^XQ^KG#|X?tV}f;5ENHgXyk9Mh/WM*D;D^]H"
}W"o""YY@9x"|`hNb>a3>8ZOSd}R4HxQU99dQ\nTxL?>}*}QMB7fhIE952^hn=-m2-
pF8T_I^yT1=)dc=t*Ge^f71cb~_^|5yZl&9LSdxR8XNUC1%^R;CiVIN~O}c%\h|&UX;j{ _#9/^1H@_Wr$!,)}v[#?
;m;`O`ZiB <Pu
OkH4jbr
WvF\w'#)~Vx|/?{zDa
\| hGEi?#r~N
zm`nL|~1~'/?>k?~gyk,b'_.41K??3d2kgb$7~QjlqN]j,Lr-9V134uNe+'4dpP.V}uvq4D}08LrTeg5Z+n@&+(P=-M"
[rw8baSjJaam+ +?b!u&2tW!IYi.fj@/ G#uZv_sgj2UXk.Γ dbq7kT%h5'Nv5[D4!l@1
5}*`"DK[%N^(Af9l] 0X`M:c01uAm\jB/.,f
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license.licensor;

```



```

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicenseVerifier;
import org.elasticsearch.test.ESTestCase;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationTests extends ESTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath("/public.key");
        priKeyPath = getDataPath("/private.key");
    }

    @After
    public void cleanUp() {
        pubKeyPath = null;
        priKeyPath = null;
    }

    public void testGeneratedLicenses() throws Exception {
        final TimeValue fortyEightHours = TimeValue.timeValueHours(2 * 24);
        final License license =
            TestUtils.generateSignedLicense(fortyEightHours, pubKeyPath, priKeyPath);
        assertTrue(LicenseVerifier.verifyLicense(license, Files.readAllBytes(pubKeyPath)));
    }

    public void testLicenseTampering() throws Exception {
        final TimeValue twoHours = TimeValue.timeValueHours(2);
        License license = TestUtils.generateSignedLicense(twoHours, pubKeyPath, priKeyPath);

        final License tamperedLicense = License.builder()
            .fromLicenseSpec(license, license.signature())
            .expiryDate(license.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
            .validate()
            .build();

        assertFalse(LicenseVerifier.verifyLicense(tamperedLicense, Files.readAllBytes(pubKeyPath)));
    }
}

```

```

public void testRandomLicenseVerification() throws Exception {
    TestUtils.LicenseSpec licenseSpec = TestUtils.generateRandomLicenseSpec(
        randomIntBetween(License.VERSION_START, License.VERSION_CURRENT));
    License generatedLicense = generateSignedLicense(licenseSpec, pubKeyPath, priKeyPath);
    assertTrue(LicenseVerifier.verifyLicense(generatedLicense, Files.readAllBytes(pubKeyPath)));
}

private static License generateSignedLicense(
    TestUtils.LicenseSpec spec, Path pubKeyPath, Path priKeyPath) throws Exception {
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)
        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }
    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }
    builder.version(spec.version);
    return signer.sign(builder.build());
}

}
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 */
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;

```

```

import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.test.ESTestCase;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;

import java.io.IOException;
import java.nio.file.Path;
import java.util.UUID;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomIntBetween;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.hamcrest.core.IsEqual.equalTo;

public class TestUtils {

    public static final String PUBLIC_KEY_RESOURCE = "/public.key";
    public static final String PRIVATE_KEY_RESOURCE = "/private.key";

    private static final FormatDateTimeFormatter formatDateTimeFormatter =
        Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser =
        new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dumpLicense(License license) throws Exception {
        XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
        builder.startObject();
        builder.startObject("license");
        license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        return Strings.toString(builder);
    }

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }

    public static long dateMath(String time, final long now) {
        return dateMathParser.parse(time, () -> now);
    }
}

```

```

public static LicenseSpec generateRandomLicenseSpec(int version) {
    boolean datesInMillis = randomBoolean();
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    String issuer = "issuer__" + randomInt();
    String issuedTo = "issuedTo__" + randomInt();
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("basic", "silver", "dev", "gold", "platinum");
    final String subscriptionType;
    final String feature;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        subscriptionType = randomFrom("gold", "silver", "platinum");
        feature = "feature__" + randomInt();
    } else {
        subscriptionType = null;
        feature = null;
    }
    int maxNodes = randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDateInMillis,
            expiryDateInMillis,
            type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDate,
            expiryDate, type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    }
}

```

```

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startObject("license")
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);

    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {
        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }
    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }
    licenses.field("version", licenseSpec.version);
    licenses.endObject();
    licenses.endObject();
    return Strings.toString(licenses);
}

```

```

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(
            license.issueDate(),
            equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(
            license.expiryDate(),
            equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

```

```

    }
}

public static License generateSignedLicense(
    TimeValue expiryDuration, Path pubKeyPath, Path priKeyPath) throws Exception {
    long issue = System.currentTimeMillis();
    int version = ESTestCase.randomIntBetween(License.VERSION_START, License.VERSION_CURRENT);
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("trial", "basic", "silver", "dev", "gold", "platinum");
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .expiryDate(issue + expiryDuration.getMillis())
        .issueDate(issue)
        .version(version)
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType(randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(ESTestCase.randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    return signer.sign(builder.build());
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(
        int version,
        String uid,
        String feature,
        long issueDateInMillis,
        long expiryDateInMillis,
        String type,

```

```

        String subscriptionType,
        String issuedTo,
        String issuer,
        int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDateInMillis = issueDateInMillis;
    this.issueDate = null;
    this.expiryDateInMillis = expiryDateInMillis;
    this.expiryDate = null;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}

public LicenseSpec(
    int version,
    String uid,
    String feature,
    String issueDate,
    String expiryDate,
    String type,
    String subscriptionType,
    String issuedTo,
    String issuer,
    int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}
}
}
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```

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*/
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationToolTests extends CommandTestCase {
    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        logger.error("project.basedir [{}]", System.getProperty("project.basedir"));
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseVerificationTool();
    }

    public void testMissingKeyPath() throws Exception {
        Path pub = createTempDir().resolve("pub");
        UserException e = expectThrows(
            UserException.class,
            () -> execute("--publicKeyPath", pub.toString()));
        assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }

    public void testMissingLicenseSpec() throws Exception {
        UserException e = expectThrows(UserException.class, () -> {
            execute("--publicKeyPath", pubKeyPath.toString());
        });
        assertTrue(
            e.getMessage(),

```



```

        e.getMessage().contains("Must specify either --license or --licenseFile"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testBrokenLicense() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + randomIntBetween(1, 1000)).build();
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--license",
            TestUtils.dumpLicense(tamperedLicense)));
    assertEquals("Invalid License!", e.getMessage());
    assertEquals(ExitCodes.DATA_ERROR, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--license",
        TestUtils.dumpLicense(signedLicense));
    assertFalse(output, output.isEmpty());
}

public void testLicenseSpecFile() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    Path licenseSpecFile = createTempFile();
    Files.write(
        licenseSpecFile,
        TestUtils.dumpLicense(signedLicense).getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    assertFalse(output, output.isEmpty());
}
}
}

```

```

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 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseGenerationToolTests extends CommandTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path pub = createTempDir().resolve("pub");
        Path pri = createTempDir().resolve("pri");
        UserException e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                pub.toString(),
                "--privateKeyPath",
                pri.toString());
        assertTrue(e.getMessage(), e.getMessage().contains("pri does not exist"));
    }
}

```

```

assertEquals(ExitCodes.USAGE, e.exitCode);

Files.createFile(pri);
e = expectThrows(
    UserException.class,
    () -> execute(
        "--publicKeyPath",
        pub.toString(),
        "--privateKeyPath",
        pri.toString()));
assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testMissingLicenseSpec() throws Exception {
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--privateKeyPath",
            priKeyPath.toString()));
    assertTrue(
        e.getMessage(),
        e.getMessage().contains("Must specify either --license or --licenseFile"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--license",
        licenseSpecString);
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

public void testLicenseSpecFile() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);

```

```

    Path licenseSpecFile = createTempFile();
    Files.write(licenseSpecFile, licenseSpecString.getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

}

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 */

package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;

import java.nio.file.Files;
import java.nio.file.Path;

import static org.hamcrest.CoreMatchers.containsString;

public class KeyPairGenerationToolTests extends CommandTestCase {

    @Override
    protected Command newCommand() {
        return new KeyPairGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path exists = createTempFile("", "existing");
        Path dne = createTempDir().resolve("dne");
        UserException e = expectThrows(
            UserException.class,
            () -> execute(
                "--publicKeyPath",
                exists.toString(),
                "--privateKeyPath",

```

```

        dne.toString());
    assertThat(e.getMessage(), containsString("existing"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
    e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            dne.toString(),
            "--privateKeyPath",
            exists.toString());
    assertThat(e.getMessage(), containsString("existing"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testTool() throws Exception {
    Path keysDir = createTempDir();
    Path publicKeyFilePath = keysDir.resolve("public");
    Path privateKeyFilePath = keysDir.resolve("private");

    execute(
        "--publicKeyPath",
        publicKeyFilePath.toString(),
        "--privateKeyPath",
        privateKeyFilePath.toString());
    assertTrue(publicKeyFilePath.toString(), Files.exists(publicKeyFilePath));
    assertTrue(privateKeyFilePath.toString(), Files.exists(privateKeyFilePath));
}

}

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 */
package org.elasticsearch.license.licensor;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.hash.MessageDigests;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.CryptUtils;
import org.elasticsearch.license.License;

import java.io.IOException;

```

```

import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Path;
import java.security.InvalidKeyException;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Base64;
import java.util.Collections;
import java.util.Map;

/**
 * Responsible for generating a license signature according to the signature spec and sign it with
 * the provided encrypted private key
 */
public class LicenseSigner {

    private static final int MAGIC_LENGTH = 13;
    private final Path publicKeyPath;
    private final Path privateKeyPath;

    public LicenseSigner(final Path privateKeyPath, final Path publicKeyPath) {
        this.publicKeyPath = publicKeyPath;
        this.privateKeyPath = privateKeyPath;
    }

    /**
     * Generates a signature for the {@code licenseSpec}. Signature structure:
     * <code>
     * | VERSION | MAGIC | PUB_KEY_DIGEST | SIGNED_LICENSE_CONTENT |
     * </code>
     *
     * @return a signed License
     */
    public License sign(License licenseSpec) throws IOException {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        final Map<String, String> licenseSpecViewMode =
            Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true");
        licenseSpec.toXContent(contentBuilder, new ToXContent.MapParams(licenseSpecViewMode));
        final byte[] signedContent;
        final boolean preV4 = licenseSpec.version() < License.VERSION_CRYPTO_ALGORITHMS;
        try {
            final Signature rsa = Signature.getInstance("SHA512withRSA");
            PrivateKey decryptedPrivateKey =

```

```

CryptUtils.readEncryptedPrivateKey(Files.readAllBytes(privateKeyPath));
    rsa.initSign(decryptedPrivateKey);
    final BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
    BytesRef ref;
    while((ref = iterator.next()) != null) {
        rsa.update(ref.bytes, ref.offset, ref.length);
    }
    signedContent = rsa.sign();
} catch (InvalidKeyException
    | IOException
    | NoSuchAlgorithmException
    | SignatureException e) {
    throw new IllegalStateException(e);
}
final byte[] magic = new byte[MAGIC_LENGTH];
SecureRandom random = new SecureRandom();
random.nextBytes(magic);
final byte[] publicKeyBytes = Files.readAllBytes(publicKeyPath);
PublicKey publicKey = CryptUtils.readPublicKey(publicKeyBytes);
final byte[] pubKeyFingerprint = preV4 ?
Base64.getEncoder().encode(CryptUtils.writeEncryptedPublicKey(publicKey)) :
    getPublicKeyFingerprint(publicKeyBytes);
byte[] bytes = new byte[4 + 4 + MAGIC_LENGTH + 4 + pubKeyFingerprint.length + 4 +
signedContent.length];
ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
byteBuffer.putInt(licenseSpec.version())
    .putInt(magic.length)
    .put(magic)
    .putInt(pubKeyFingerprint.length)
    .put(pubKeyFingerprint)
    .putInt(signedContent.length)
    .put(signedContent);

return License.builder()
    .fromLicenseSpec(licenseSpec, Base64.getEncoder().encodeToString(bytes))
    .build();
}

private byte[] getPublicKeyFingerprint(byte[] keyBytes) {
    MessageDigest sha256 = MessageDigests.sha256();
    sha256.update(keyBytes);
    return sha256.digest();
}
}
}

```

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`src/test/org/apache/commons/codec/language/DoubleMetaphoneTest.java`

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Apache HttpComponents Client

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*/

package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.common.settings.Settings;

import org.elasticsearch.test.ESTestCase;

import java.util.ArrayList;

import java.util.Arrays;

import java.util.Collections;

import java.util.List;

public class FieldPermissionsCacheTests extends ESTestCase {

```
    public void testFieldPermissionsCaching() {
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
        String[] allowed = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*",
randomAlphaOfLength(5) + "*"};
        String[] denied = new String[]{allowed[0] + randomAlphaOfLength(5), allowed[1] +
randomAlphaOfLength(5),
            allowed[2] + randomAlphaOfLength(5)};
        FieldPermissions fieldPermissions = fieldPermissionsCache.getFieldPermissions(allowed, denied);
        assertNotNull(fieldPermissions);
        final String[] allowed2 = randomBoolean() ? allowed : Arrays.copyOf(allowed, allowed.length);
        final String[] denied2 = randomBoolean() ? denied : Arrays.copyOf(denied, denied.length);
        assertEquals(fieldPermissions, fieldPermissionsCache.getFieldPermissions(allowed2, denied2));
    }
```

```
    public void testMergeFieldPermissions() {
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
        String allowedPrefix1 = randomAlphaOfLength(5);
        String allowedPrefix2 = randomAlphaOfLength(5);
        String[] allowed1 = new String[]{allowedPrefix1 + "*"};
        String[] allowed2 = new String[]{allowedPrefix2 + "*"};
        String[] denied1 = new String[]{allowedPrefix1 + "a"};
        String[] denied2 = new String[]{allowedPrefix2 + "a"};
        FieldPermissions fieldPermissions1 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
            new FieldPermissions(fieldPermissionDef(allowed1, denied1));
        FieldPermissions fieldPermissions2 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
            new FieldPermissions(fieldPermissionDef(allowed2, denied2));
        FieldPermissions mergedFieldPermissions =
            fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
    }
```



```

assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix1 + "b"));
assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix2 + "b"));
assertFalse(mergedFieldPermissions.grantsAccessTo(denied1[0]));
assertFalse(mergedFieldPermissions.grantsAccessTo(denied2[0]));

allowed1 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
allowed2 = null;
denied1 = new String[]{allowed1[0] + "a", allowed1[1] + "a"};
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertFalse(mergedFieldPermissions.hasFieldLevelSecurity());

allowed1 = new String[]{};
allowed2 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
denied1 = new String[]{};
denied2 = new String[]{allowed2[0] + "a", allowed2[1] + "a"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
for (String field : allowed2) {
    assertTrue(mergedFieldPermissions.grantsAccessTo(field));
}
for (String field : denied2) {
    assertFalse(mergedFieldPermissions.grantsAccessTo(field));
}

allowed1 = randomBoolean() ? null : new String[]{"*"};
allowed2 = randomBoolean() ? null : new String[]{"*"};
denied1 = new String[]{"a"};
denied2 = new String[]{"b"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));

allowed1 = new String[] { "a*" };

```

```

allowed2 = new String[] { "b*" };
denied1 = new String[] { "aa*" };
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa1"));
assertTrue(mergedFieldPermissions.grantsAccessTo("a1"));
}

public void testNonFlsAndFlsMerging() {
    List<FieldPermissions> permissionsList = new ArrayList<>();
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field1" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field2", "query*" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field1", "field2" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(null, null)));

    FieldPermissionsCache cache = new FieldPermissionsCache(Settings.EMPTY);
    for (int i = 0; i < scaledRandomIntBetween(1, 12); i++) {
        Collections.shuffle(permissionsList, random());
        FieldPermissions result = cache.getFieldPermissions(permissionsList);
        assertFalse(result.hasFieldLevelSecurity());
    }
}

private static FieldPermissionsDefinition fieldPermissionDef(String[] granted, String[] denied) {
    return new FieldPermissionsDefinition(granted, denied);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.service.ClusterService;

```

```

import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.Collection;
import java.util.concurrent.CountDownLatch;

public abstract class AbstractLicensesIntegrationTestCase extends ESIntegTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), false).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, CommonAnalysisPlugin.class);
    }

    @Override
    protected Settings transportClientSettings() {
        // Plugin should be loaded on the transport client as well
        return nodeSettings(0);
    }

    protected void putLicense(final License license) throws InterruptedException {
        final CountDownLatch latch = new CountDownLatch(1);
        ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
        clusterService.submitStateUpdateTask("putting license", new ClusterStateUpdateTask() {
            @Override
            public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
                latch.countDown();
            }
        });

        @Override
        public ClusterState execute(ClusterState currentState) throws Exception {
            Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());

```

```

        mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error("error on metaData cleanup after test", e);
    }
});
latch.await();
}

protected void putLicenseTombstone() throws InterruptedException {
    putLicense(LicensesMetaData.LICENSE_TOMBSTONE);
}

protected void wipeAllLicenses() throws InterruptedException {
    final CountdownLatch latch = new CountdownLatch(1);
    ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
    clusterService.submitStateUpdateTask("delete licensing metadata", new ClusterStateUpdateTask() {
        @Override
        public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
            latch.countDown();
        }
    });

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
        mdBuilder.removeCustom(LicensesMetaData.TYPE);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error("error on metaData cleanup after test", e);
    }
});
latch.await();
}

protected void assertLicenseActive(boolean active) throws InterruptedException {
    boolean success = awaitBusy() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.isActive() == active) {
                return true;
            }
        }
    }
}

```

```

        return false;
    });
    assertTrue(success);
}

}
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import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.junit.After;
import org.junit.Before;
import org.mockito.ArgumentCaptor;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseClusterChangeTests extends AbstractLicenseServiceTestCase {

    private TestUtils.AssertingLicenseState licenseState;

    @Before
    public void setup() {
        licenseState = new TestUtils.AssertingLicenseState();
        setInitialState(null, licenseState, Settings.EMPTY);
        licenseService.start();
    }

    @After
    public void teardown() {

```

```

        licenseService.stop();
    }

    public void testNotificationOnNewLicense() throws Exception {
        ClusterState oldState = ClusterState.builder(new ClusterName("a")).build();
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(1));
        assertTrue(licenseState.activeUpdates.get(0));
    }

    public void testNoNotificationOnExistingLicense() throws Exception {
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        ClusterState oldState = ClusterState.builder(newState).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(0));
    }

    public void testSelfGeneratedLicenseGeneration() throws Exception {
        DiscoveryNode master = new DiscoveryNode("b", buildNewFakeTransportAddress(), emptyMap(), emptySet(),
Version.CURRENT);
        ClusterState oldState = ClusterState.builder(new ClusterName("a"))
            .nodes(DiscoveryNodes.builder().masterNodeId(master.getId()).add(master)).build();
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        ClusterState newState = ClusterState.builder(oldState).nodes(discoveryNodes).build();

        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(newState);
        LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
        assertEquals(licenseType, licenseMetaData.getLicense().type());
        long expiration;
        if (licenseType.equals("basic")) {
            expiration = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
        } else {
            expiration = LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis() +
clock.millis();
        }
    }

```

```

    }
    assertEquals(expiration, licenseMetaData.getLicense().expiryDate());
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.license.License.OperationMode.BASIC;
import static org.elasticsearch.license.License.OperationMode.GOLD;
import static org.elasticsearch.license.License.OperationMode.MISSING;
import static org.elasticsearch.license.License.OperationMode.PLATINUM;
import static org.elasticsearch.license.License.OperationMode.STANDARD;
import static org.elasticsearch.license.License.OperationMode.TRIAL;
import static org.hamcrest.Matchers.is;

/**
 * Unit tests for the {@link XPackLicenseState}
 */
public class XPackLicenseStateTests extends ESTestCase {

    /** Creates a license state with the given license type and active state, and checks the given method returns
    expected. */
    void assertAllowed(OperationMode mode, boolean active, Predicate<XPackLicenseState> predicate, boolean
    expected) {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        licenseState.update(mode, active);
        assertEquals(expected, predicate.test(licenseState));
    }

    /**
     * Checks the ack message going from the {@code from} license type to {@code to} license type.
     * TODO: check the actual messages, not just the number of them! This was copied from previous license tests...
     */
    void assertAckMessages(String feature, OperationMode from, OperationMode to, int expectedMessages) {

```

```

String[] gotMessages = XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.get(feature).apply(from, to);
assertEquals(expectedMessages, gotMessages.length);
}

static <T> T randomFrom(T[] values, Predicate<T> filter) {
    return randomFrom(Arrays.stream(values).filter(filter).collect(Collectors.toList()));
}

static OperationMode randomMode() {
    return randomFrom(OperationMode.values());
}

public static OperationMode randomTrialStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomTrialOrPlatinumMode() {
    return randomFrom(TRIAL, PLATINUM);
}

public static OperationMode randomTrialBasicStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, BASIC, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomBasicStandardOrGold() {
    return randomFrom(BASIC, STANDARD, GOLD);
}

public void testSecurityDefaults() {
    XPackLicenseState licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(),
true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

    licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

```



```

}

public void testSecurityBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, true);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, false);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, true);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, false);
}

```

```

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGold() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, true);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, false);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, true);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
}

```

```

    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, false);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityAckBasicToNotGoldOrStandard() {
    OperationMode toMode = randomFrom(OperationMode.values(), mode -> mode != GOLD && mode !=
STANDARD);
    assertAckMessages(XPackField.SECURITY, BASIC, toMode, 0);
}

public void testSecurityAckAnyToTrialOrPlatinum() {
    assertAckMessages(XPackField.SECURITY, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSecurityAckTrialStandardGoldOrPlatinumToBasic() {
    assertAckMessages(XPackField.SECURITY, randomTrialStandardGoldOrPlatinumMode(), BASIC, 3);
}

public void testSecurityAckAnyToStandard() {
    OperationMode from = randomFrom(BASIC, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.SECURITY, from, STANDARD, 4);
}

public void testSecurityAckBasicStandardTrialOrPlatinumToGold() {
    OperationMode from = randomFrom(BASIC, PLATINUM, TRIAL, STANDARD);
    assertAckMessages(XPackField.SECURITY, from, GOLD, 2);
}

public void testMonitoringAckBasicToAny() {
    assertAckMessages(XPackField.MONITORING, BASIC, randomMode(), 0);
}

public void testMonitoringAckAnyToTrialGoldOrPlatinum() {
    assertAckMessages(XPackField.MONITORING, randomMode(),

```

```

randomTrialStandardGoldOrPlatinumMode(), 0);
}

public void testMonitoringAckNotBasicToBasic() {
    OperationMode from = randomFrom(STANDARD, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.MONITORING, from, BASIC, 2);
}

public void testMonitoringAllowed() {
    assertAllowed(randomMode(), true, XPackLicenseState::isMonitoringAllowed, true);
    assertAllowed(randomMode(), false, XPackLicenseState::isMonitoringAllowed, false);
}

public void testMonitoringUpdateRetention() {
    assertAllowed(STANDARD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(TRIAL, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(BASIC, true, XPackLicenseState::isUpdateRetentionAllowed, false);
    assertAllowed(MISSING, false, XPackLicenseState::isUpdateRetentionAllowed, false);
}

public void testWatcherPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isWatcherAllowed, true);
}

public void testWatcherBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactivePlatinumGoldTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testGraphPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isGraphAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isGraphAllowed, true);
}

```

```

public void testGraphBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isMachineLearningAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isMachineLearningAllowed, true);
}

public void testMachineLearningBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testLogstashPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isLogstashAllowed, true);
}

public void testLogstashBasicLicense() throws Exception {

```

```

    assertAllowed(BASIC, true, XPackLicenseState::isLogstashAllowed, false);
}

public void testLogstashInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(TRIAL, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isLogstashAllowed, false);
}

public void testSqlDefaults() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, true);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, false);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, true);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, false);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

```

```

public void testSqlGold() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, true);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, false);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, true);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, false);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlAckAnyToTrialOrPlatinum() {
    assertAckMessages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
    assertAckMessages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
}

}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartTrialLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected boolean addMockHttpTransport() {
        return false; // enable http
    }

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic").build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartTrial() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
    }

```



```

ensureStartingWithBasic();

RestClient restClient = getRestClient();
Response response = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":true}", body);

// Test that starting will fail without acknowledgement
Response response2 = restClient.performRequest("POST", "/_xpack/license/start_trial");
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"trial_was_started\":false"));
assertTrue(body2.contains("\"error_message\": \"Operation failed: Needs acknowledgement.\""));
assertTrue(body2.contains("\"acknowledged\":false"));

assertBusy(() -> {
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals("basic", getLicenseResponse.license().type());
});

String type = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Response response3 = restClient.performRequest("POST",
"/_xpack/license/start_trial?acknowledge=true&type=" + type);
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertTrue(body3.contains("\"trial_was_started\":true"));
assertTrue(body3.contains("\"type\": \"" + type + "\""));
assertTrue(body3.contains("\"acknowledged\":true"));

assertBusy(() -> {
    GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals(type, postTrialLicenseResponse.license().type());
});

Response response4 = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response4.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":false}", body4);

String secondAttemptType = randomFrom(LicenseService.VALID_TRIAL_TYPES);

ResponseException ex = expectThrows(ResponseException.class,

```

```

        () -> restClient.performRequest("POST", "/_xpack/license/start_trial?acknowledge=true&type=" +
secondAttemptType));
        Response response5 = ex.getResponse();
        String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
        assertEquals(403, response5.getStatusLine().getStatusCode());
        assertTrue(body5.contains("\"trial_was_started\":false"));
        assertTrue(body5.contains("\"error_message\": \"Operation failed: Trial was already activated.\""));
    }

```

```

public void testInvalidType() throws Exception {
    ensureStartingWithBasic();

    ResponseException ex = expectThrows(ResponseException.class, () ->
        getRestClient().performRequest("POST", "/_xpack/license/start_trial?type=basic"));
    Response response = ex.getResponse();
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(400, response.getStatusLine().getStatusCode());
    assertTrue(body.contains("\"type\": \"illegal_argument_exception\""));
    assertTrue(body.contains("\"reason\": \"Cannot start trial of type [basic]. Valid trial types are [\"]"));
}

```

```

private void ensureStartingWithBasic() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();

    if ("basic".equals(getLicenseResponse.license().type()) == false) {
        licensingClient.preparePostStartBasic().setAcknowledge(true).get();
    }

    assertBusy(() -> {
        GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("basic", postTrialLicenseResponse.license().type());
    });
}

```

```

/*

```

```

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*/

```

```

package org.elasticsearch.license;

```

```

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;

```

```

import org.elasticsearch.env.Environment;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.nullValue;

@ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
transportClientRatio = 0)
public class LicenseServiceClusterTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return nodeSettingsBuilder(nodeOrdinal).build();
    }

    @Override
    protected boolean addMockHttpTransport() {
        return false; // enable http
    }

    private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put("resource.reload.interval.high", "500ms"); // for license mode file watcher
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return nodePlugins();
    }
}

```

```

public void testClusterRestartWithLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting { } node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(license.operationMode());

    logger.info("--> restart all nodes");
    internalCluster().fullRestart();
    ensureYellow();
    licensingClient = new LicensingClient(client());
    logger.info("--> get and check signed license");
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    logger.info("--> remove licenses");
    licensingClient.prepareDeleteLicense().get();
    assertOperationMode(License.OperationMode.MISSING);

    logger.info("--> restart all nodes");
    internalCluster().fullRestart();
    licensingClient = new LicensingClient(client());
    ensureYellow();
    assertThat(licensingClient.prepareGetLicense().get().license(), nullValue());
    assertOperationMode(License.OperationMode.MISSING);

    wipeAllLicenses();
}

public void testCloudInternalLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting { } node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("cloud_internal", License.VERSION_CURRENT,

```

```

System.currentTimeMillis(),
    TimeValue.timeValueMinutes(1));
putLicense(license);
assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
assertOperationMode(License.OperationMode.PLATINUM);
writeCloudInternalMode("gold");
assertOperationMode(License.OperationMode.GOLD);
writeCloudInternalMode("basic");
assertOperationMode(License.OperationMode.BASIC);
}

public void testClusterRestartWhileEnabled() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
}

public void testClusterRestartWhileGrace() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    assertLicenseActive(true);
    putLicense(TestUtils.generateSignedLicense(TimeValue.timeValueMillis(0)));
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for grace_period");
    assertLicenseActive(true);
}

public void testClusterRestartWhileExpired() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateExpiredNonBasicLicense(System.currentTimeMillis() -
LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertLicenseActive(false);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
}

```

```

    logger.info("--> await node for disabled");
    assertLicenseActive(false);
}

public void testClusterRestartWithOldSignature() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateSignedLicenseOldSignature());
    LicensingClient licensingClient = new LicensingClient(client());
    assertThat(licensingClient.prepareGetLicense().get().license().version(),
    equalTo(License.VERSION_START_DATE));
    logger.info("--> restart node");
    internalCluster().fullRestart(); // restart so that license is updated
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
    licensingClient = new LicensingClient(client());
    assertThat(licensingClient.prepareGetLicense().get().license().version(),
    equalTo(License.VERSION_CURRENT)); //license updated
    internalCluster().fullRestart(); // restart once more and verify updated license is active
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
}

private void assertOperationMode(License.OperationMode operationMode) throws InterruptedException {
    boolean success = awaitBusy() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.getOperationMode() == operationMode) {
                return true;
            }
        }
        return false;
    };
    assertTrue(success);
}

private void writeCloudInternalMode(String mode) throws Exception {
    for (Environment environment : internalCluster().getDataOrMasterNodeInstances(Environment.class)) {
        Path licenseModePath = XPackPlugin.resolveConfigFile(environment, "license_mode");
        Files.createDirectories(licenseModePath.getParent());
        Files.write(licenseModePath, mode.getBytes(StandardCharsets.UTF_8));
    }
}
}

```

```

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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.test.ESTestCase;

import java.util.Arrays;

import static org.hamcrest.Matchers.contains;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.hasSize;

public class LicenseUtilsTests extends ESTestCase {

    public void testNewExpirationException() {
        for (String feature : Arrays.asList("feature", randomAlphaOfLength(5), null, "")) {
            ElasticsearchSecurityException exception = LicenseUtils.newComplianceException(feature);
            assertNotNull(exception);
            assertThat(exception.getMetadataKeys(), contains(LicenseUtils.EXPIRED_FEATURE_METADATA));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasSize(1));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA).iterator().next(),
                equalTo(feature));
        }
    }

    public void testIsLicenseExpiredException() {
        ElasticsearchSecurityException exception = LicenseUtils.newComplianceException("feature");
        assertTrue(LicenseUtils.isLicenseExpiredException(exception));

        exception = new ElasticsearchSecurityException("msg");
        assertFalse(LicenseUtils.isLicenseExpiredException(exception));
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.Before;

```

```

import java.nio.file.Path;

import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Matchers.eq;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.verifyZeroInteractions;

public class LicenseOperationModeUpdateTests extends ESTestCase {

    private OperationModeFileWatcher operationModeFileWatcher;
    private Path licenseModeFile;
    private ResourceWatcherService resourceWatcherService;

    @Before
    public void init() throws Exception {
        licenseModeFile = createTempFile();
        resourceWatcherService = mock(ResourceWatcherService.class);
        operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService, licenseModeFile,
logger, () -> {});
    }

    public void testLicenseOperationModeUpdate() throws Exception {
        String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
        License license = License.builder()
            .uid("id")
            .expiryDate(0)
            .issueDate(0)
            .issuedTo("elasticsearch")
            .issuer("issuer")
            .type(type)
            .maxNodes(1)
            .build();

        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
        OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
        license.setOperationModeFileWatcher(operationModeFileWatcher);
        verifyZeroInteractions(resourceWatcherService);
        assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
    }

    public void testCloudInternalLicenseOperationModeUpdate() throws Exception {
        License license = License.builder()
            .uid("id")
            .expiryDate(0)

```



```

        .issueDate(0)
        .issuedTo("elasticsearch")
        .issuer("issuer")
        .type("cloud_internal")
        .maxNodes(1)
        .build();

    assertThat(license.operationMode(), equalTo(License.OperationMode.PLATINUM));
    OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
    license.setOperationModeFileWatcher(operationModeFileWatcher);
    verify(resourceWatcherService, times(1)).add(any(FileWatcher.class),
    eq(ResourceWatcherService.Frequency.HIGH));
    assertThat(license.operationMode(), equalTo(License.OperationMode.GOLD));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import org.junit.Before;

import static org.hamcrest.Matchers.equalTo;

public class LicenseScheduleTests extends ESTestCase {

    private License license;
    private SchedulerEngine.Schedule schedule;

    @Before
    public void setUp() throws Exception {
        license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
        schedule = LicenseService.nextLicenseCheck(license);
    }

    public void testEnabledLicenseSchedule() throws Exception {
        int expiryDuration = (int) (license.expiryDate() - license.issueDate());
        long triggeredTime = license.issueDate() + between(0, expiryDuration);
        assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(license.expiryDate()));
    }

    public void testGraceLicenseSchedule() throws Exception {

```

```

    long triggeredTime = license.expiryDate() + between(1,
        ((int) LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis()));
}

public void testExpiredLicenseSchedule() throws Exception {
    long triggeredTime = license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis() +
        randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
        equalTo(-1L));
}

public void testInvalidLicenseSchedule() throws Exception {
    long triggeredTime = license.issueDate() - randomIntBetween(1, 1000);
    assertThat(schedule.nextScheduledTimeAfter(triggeredTime, triggeredTime),
        equalTo(license.issueDate()));
}
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;

import static org.elasticsearch.common.unit.TimeValue.timeValueMillis;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.nullValue;

public class ExpirationCallbackTests extends ESTestCase {

    public void testPostExpirationDelay() throws Exception {
        TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
        TimeValue min = TimeValue.timeValueSeconds(1);
        TimeValue max = TimeValue.timeValueSeconds(4);
        TimeValue frequency = TimeValue.timeValueSeconds(1);
        NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, max, frequency);
        long now = System.currentTimeMillis();
        long expiryDate = now + expiryDuration.getMillis();
        assertThat(post.delay(expiryDate, now),
            equalTo(TimeValue.timeValueMillis(expiryDuration.getMillis() + min.getMillis()))); // before license
        expiry
        assertThat(post.delay(expiryDate, expiryDate), equalTo(min)); // on license expiry
        int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());

```

```

    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackDelay(post, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

```

```

public void testPreExpirationDelay() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration.getMillis();
    assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
    assertExpirationCallbackDelay(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

```

```

public void testPostExpirationWithNullMax() throws Exception {
    int postExpirySeconds = randomIntBetween(5, 10);
    TimeValue postExpiryDuration = TimeValue.timeValueSeconds(postExpirySeconds);
    TimeValue min = TimeValue.timeValueSeconds(postExpirySeconds - randomIntBetween(1, 3));

    final ExpirationCallback.Post post = new NoopPostExpirationCallback(min, null, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(post.delay(now - postExpiryDuration.millis(), now), equalTo(TimeValue.timeValueMillis(0)));
}

```

```

public void testPreExpirationWithNullMin() throws Exception {
    int expirySeconds = randomIntBetween(5, 10);
    TimeValue expiryDuration = TimeValue.timeValueSeconds(expirySeconds);
    TimeValue max = TimeValue.timeValueSeconds(expirySeconds + randomIntBetween(1, 10));

    final ExpirationCallback.Pre pre = new NoopPreExpirationCallback(null, max, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(pre.delay(expiryDuration.millis() + now, now), equalTo(TimeValue.timeValueMillis(0)));
}

```

```

public void testPreExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
}

```

```

    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

public void testPostExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPostExpirationCallback pre = new NoopPostExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

private void assertExpirationCallbackDelay(ExpirationCallback expirationCallback, long expiryDuration,
int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    // bounds
    assertThat(expirationCallback.delay(expiryDate, now + earliestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
    assertThat(expirationCallback.delay(expiryDate, now + latestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
    // in match
    assertThat(expirationCallback.delay(expiryDate,
now + randomIntBetween(earliestValidTriggerDelay, latestValidTriggerDelay)),
equalTo(TimeValue.timeValueMillis(0)));
    // out of bounds
    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay);
    assertThat(expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch),
equalTo(TimeValue.timeValueMillis(earliestValidTriggerDelay - deltaBeforeEarliestMatch)));
    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
    assertThat(expirationCallback.delay(expiryDate, expiryDate + deltaAfterLatestMatch), nullValue());
}

public void assertExpirationCallbackScheduleTime(ExpirationCallback expirationCallback, long expiryDuration,
int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    int validTriggerInterval = between(earliestValidTriggerDelay, latestValidTriggerDelay);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
now + validTriggerInterval, now + validTriggerInterval),
equalTo(now + validTriggerInterval));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + validTriggerInterval),
equalTo(now + validTriggerInterval + expirationCallback.getFrequency()));
}

```

```

    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay - 1);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now +
deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaBeforeEarliestMatch, now + deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));

    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + deltaAfterLatestMatch),
        equalTo(-1L));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaAfterLatestMatch, now + deltaAfterLatestMatch),
        equalTo(-1L));
}

private static class NoopPostExpirationCallback extends ExpirationCallback.Post {

    NoopPostExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}

private static class NoopPreExpirationCallback extends ExpirationCallback.Pre {

    NoopPreExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}
}
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 */
package org.elasticsearch.license;

import com.carrotsearch.randomizedtesting.RandomizedTest;

```

```

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.licensor.LicenseSigner;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;
import org.junit.Assert;

import java.io.IOException;
import java.io.InputStream;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardCopyOption;
import java.util.ArrayList;
import java.util.List;
import java.util.UUID;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReference;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static org.apache.lucene.util.LuceneTestCase.createTempFile;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomAlphaOfLength;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.elasticsearch.test.ESTestCase.randomIntBetween;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.junit.Assert.assertThat;

public class TestUtils {

    private static final FormatDateTimeFormatter formatDateTimeFormatter = Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser = new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
    }
}

```

```

public static long dateMath(String time, final long now) {
    return dateMathParser.parse(time, () -> now);
}

public static LicenseSpec generateRandomLicenseSpec(int version) {
    boolean datesInMillis = randomBoolean();
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    String feature = "feature__" + randomInt();
    String issuer = "issuer__" + randomInt();
    String issuedTo = "issuedTo__" + randomInt();
    final String type;
    final String subscriptionType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        subscriptionType = randomFrom("gold", "silver", "platinum");
        type = "subscription";//randomFrom("subscription", "internal", "development");
    } else {
        subscriptionType = null;
        type = randomFrom("basic", "dev", "gold", "silver", "platinum");
    }
    int maxNodes = RandomizedTest.randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(version, uid, feature, issueDateInMillis, expiryDateInMillis, type, subscriptionType,
issuedTo, issuer,
        maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(version, uid, feature, issueDate, expiryDate, type, subscriptionType, issuedTo,
issuer, maxNodes);
    }
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startArray("licenses");
    licenses.startObject()
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);
}

```

```

if (licenseSpec.issueDate != null) {
    licenses.field("issue_date", licenseSpec.issueDate);
} else {
    licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
}
if (licenseSpec.expiryDate != null) {
    licenses.field("expiry_date", licenseSpec.expiryDate);
} else {
    licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
}
licenses.field("version", licenseSpec.version);
licenses.endObject();
licenses.endArray();
licenses.endObject();
return Strings.toString(licenses);
}

public static License generateLicenses(LicenseSpec spec) {
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)
        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }
    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }
    return builder.build();
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(license.issueDate(), equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    }
}

```



```

    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(String issueDate, String expiryDate) {
        this(License.VERSION_CURRENT, UUID.randomUUID().toString(), "feature", issueDate, expiryDate,
            "trial", "none", "customer",
            "elasticsearch", 5);
    }

    public LicenseSpec(int version, String uid, String feature, long issueDateInMillis, long expiryDateInMillis,
        String type,
        String subscriptionType, String issuedTo, String issuer, int maxNodes) {
        this.version = version;
        this.feature = feature;
        this.issueDateInMillis = issueDateInMillis;
        this.issueDate = null;
        this.expiryDateInMillis = expiryDateInMillis;
        this.expiryDate = null;
        this.uid = uid;
        this.type = type;
        this.subscriptionType = subscriptionType;
        this.issuedTo = issuedTo;
        this.issuer = issuer;
        this.maxNodes = maxNodes;
    }

    public LicenseSpec(int version, String uid, String feature, String issueDate, String expiryDate, String type,

```

```

        String subscriptionType, String issuedTo, String issuer, int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
    }
}

private static Path getTestPriKeyPath() throws Exception {
    return getResourcePath("/private.key");
}

private static Path getTestPubKeyPath() throws Exception {
    return getResourcePath("/public.key");
}

public static String dumpLicense(License license) throws Exception {
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    builder.startObject();
    builder.startObject("license");
    license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    return Strings.toString(builder);
}

public static License generateSignedLicense(TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, -1, expiryDuration);
}

public static License generateSignedLicense(String type, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(type, -1, expiryDuration);
}

public static License generateSignedLicense(long issueDate, TimeValue expiryDuration) throws Exception {
    return generateSignedLicense(null, issueDate, expiryDuration);
}

public static License generateSignedLicense(String type, long issueDate, TimeValue expiryDuration) throws
Exception {
    return generateSignedLicense(type, randomIntBetween(License.VERSION_START,

```

```

License.VERSION_CURRENT), issueDate, expiryDuration);
}

public static License generateSignedLicenseOldSignature() {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_START_DATE)
        .issuedTo("customer")
        .maxNodes(5)
        .type("trial")
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(24).getMillis());
    return SelfGeneratedLicense.create(specBuilder, License.VERSION_START_DATE);
}

/**
 * This method which chooses the license type randomly if the type is null. However, it will not randomly
 * choose trial or basic types as those types can only be self-generated.
 */
public static License generateSignedLicense(String type, int version, long issueDate, TimeValue expiryDuration)
throws Exception {
    long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() -
TimeValue.timeValueHours(2).getMillis();
    final String licenseType;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        licenseType = randomFrom("subscription", "internal", "development");
    } else {
        licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
    }
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(version)
        .expiryDate(System.currentTimeMillis() + expiryDuration.getMillis())
        .issueDate(issue)
        .type(licenseType)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType((type != null) ? type : randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(randomAlphaOfLength(10));
    }
    final LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateSignedLicense(License.Builder builder) throws Exception {

```

```

LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
return signer.sign(builder.build());
}

public static License generateExpiredNonBasicLicense(long expiryDate) throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"), expiryDate);
}

public static License generateExpiredNonBasicLicense() throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

public static License generateExpiredNonBasicLicense(String type) throws Exception {
    return generateExpiredNonBasicLicense(type,
        System.currentTimeMillis() - TimeUnit.timeValueHours(randomIntBetween(1, 10)).getMillis());
}

public static License generateExpiredNonBasicLicense(String type, long expiryDate) throws Exception {
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(expiryDate)
        .issueDate(expiryDate - TimeUnit.timeValueMinutes(10).getMillis())
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

private static Path getResourcePath(String resource) throws Exception {
    Path resourceFile = createTempFile();
    try (InputStream resourceInput = TestUtils.class.getResourceAsStream(resource)) {
        Files.copy(resourceInput, resourceFile, StandardCopyOption.REPLACE_EXISTING);
    }
    return resourceFile;
}

public static void registerAndAckSignedLicenses(final LicenseService licenseService, License license,
        final LicensesStatus expectedStatus) {
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(license).acknowledge(true);
    final CountdownLatch latch = new CountdownLatch(1);
    final AtomicReference<LicensesStatus> status = new AtomicReference<>();
    licenseService.registerLicense(putLicenseRequest, new ActionListener<PutLicenseResponse>() {
        @Override
        public void onResponse(PutLicenseResponse licensesUpdateResponse) {
            status.set(licensesUpdateResponse.status());
        }
    });
}

```

```

        latch.countDown();
    }

    @Override
    public void onFailure(Exception e) {
        latch.countDown();
    }
});
try {
    latch.await();
} catch (InterruptedException e) {
    Assert.fail(e.getMessage());
}
assertThat(status.get(), equalTo(expectedStatus));
}

public static class AssertingLicenseState extends XPackLicenseState {
    public final List<License.OperationMode> modeUpdates = new ArrayList<>();
    public final List<Boolean> activeUpdates = new ArrayList<>();

    public AssertingLicenseState() {
        super(Settings.EMPTY);
    }

    @Override
    void update(License.OperationMode mode, boolean active) {
        modeUpdates.add(mode);
        activeUpdates.add(active);
    }
}

/**
 * A license state that makes the {@link #update(License.OperationMode, boolean)}
 * method public for use in tests.
 */
public static class UpdatableLicenseState extends XPackLicenseState {
    public UpdatableLicenseState() {
        this(Settings.EMPTY);
    }

    public UpdatableLicenseState(Settings settings) {
        super(settings);
    }

    @Override
    public void update(License.OperationMode mode, boolean active) {
        super.update(mode, active);
    }
}

```

```

    }

    public static void putLicense(MetaData.Builder builder, License license) {
        builder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.common.unit.TimeValue.timeValueHours;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicensesAcknowledgementTests extends AbstractLicenseServiceTestCase {

    public void testAcknowledgment() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(TestUtils.generateSignedLicense("gold", timeValueHours(2)), licenseState, Settings.EMPTY);
        licenseService.start();
        // try installing a signed license
        long issueDate = System.currentTimeMillis() - TimeValue.timeValueHours(24 * 2).getMillis();
        License signedLicense = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, issueDate,
timeValueHours(10));
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
        // ensure acknowledgement message was part of the response
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
        assertThat(licenseService.getLicense(), not(signedLicense));
        verify(clusterService, times(0)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

        // try installing a signed license with acknowledgement
        putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
        // ensure license was installed and no acknowledgment message was returned
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
        verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
    }
}

```

```

}

public void testRejectUpgradeToProductionWithoutTLS() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.EMPTY);
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    // ensure acknowledgement message was part of the response
    IllegalStateException ise = expectThrows(IllegalStateException.class, () ->
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true)));
    assertEquals("Cannot install a [PLATINUM] license unless TLS is configured or security is disabled",
ise.getMessage());
}

public void testUpgradeToProductionWithoutTLSAndSecurityDisabled() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", false).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testUpgradeToProductionWithTLSAndSecurity() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", true)
        .put("xpack.security.transport.ssl.enabled", true).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,

```

```

LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
    private final boolean expectedAcknowledgement;
    private final LicensesStatus expectedStatus;
    private final boolean expectAckMessages;

    AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
        boolean expectAckMessages) {
        this.expectedAcknowledgement = expectedAcknowledgement;
        this.expectedStatus = expectedStatus;
        this.expectAckMessages = expectAckMessages;
    }

    @Override
    public void onResponse(PutLicenseResponse licensesUpdateResponse) {
        assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
        assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
        assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
    }

    @Override
    public void onFailure(Exception throwable) {
        throw new RuntimeException(throwable);
    }
}
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.settings.Settings;

```



```

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.Before;

import java.util.Collection;
import java.util.Collections;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicBoolean;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;

public class LicensesManagerServiceTests extends ESSingleNodeTestCase {

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        return Settings.builder()
            .put(super.nodeSettings())
            .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
            .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
            .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
            .put(XPackSettings.GRAPH_ENABLED.getKey(), false)
            .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
            .build();
    }

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Before
    public void waitForTrialLicenseToBeGenerated() throws Exception {
        assertBusy(() ->
assertNotNull(getInstanceFromNode(ClusterService.class).state().metaData().custom(LicensesMetaData.TYPE)));
    }

    public void testStoreAndGetLicenses() throws Exception {
        LicenseService licenseService = getInstanceFromNode(LicenseService.class);
        ClusterService clusterService = getInstanceFromNode(ClusterService.class);

```

```

License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueHours(1));
TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
License silverLicense = TestUtils.generateSignedLicense("silver", TimeValue.timeValueHours(2));
TestUtils.registerAndAckSignedLicenses(licenseService, silverLicense, LicensesStatus.VALID);
License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueHours(1));
TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), equalTo(platinumLicense));
final License getLicenses = licenseService.getLicense();
assertThat(getLicenses, equalTo(platinumLicense));
}

```

// TODO: Add test/feature blocking the registration of basic license

```

public void testEffectiveLicenses() throws Exception {
    final LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    final ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueSeconds(5));
    // put gold license
    TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(goldLicense));

    License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueSeconds(3));
    // put platinum license
    TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(platinumLicense));
}

```

```

public void testInvalidLicenseStorage() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License signedLicense = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    TestUtils.registerAndAckSignedLicenses(licenseService, tamperedLicense, LicensesStatus.INVALID);

    // ensure that the invalid license never made it to cluster state
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), not(equalTo(tamperedLicense)));
}

```

```

public void testRemoveLicenses() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);

    // generate signed licenses
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(1));
    TestUtils.registerAndAckSignedLicenses(licenseService, license, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), not(LicensesMetaData.LICENSE_TOMBSTONE));

    // remove signed licenses
    removeAndAckSignedLicenses(licenseService);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

private void removeAndAckSignedLicenses(final LicenseService licenseService) {
    final CountdownLatch latch = new CountdownLatch(1);
    final AtomicBoolean success = new AtomicBoolean(false);
    licenseService.removeLicense(new DeleteLicenseRequest(), new
ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            if (clusterStateUpdateResponse.isAcknowledged()) {
                success.set(true);
            }
            latch.countDown();
        }

        @Override
        public void onFailure(Exception throwable) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {
        fail(e.getMessage());
    }
    assertThat("remove license(s) failed", success.get(), equalTo(true));
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/

```

```

package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.threadpool.TestThreadPool;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.After;
import org.junit.Before;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;

import static org.hamcrest.Matchers.equalTo;

public class OperationModeFileWatcherTests extends ESTestCase {
    private ResourceWatcherService watcherService;
    private TestThreadPool threadPool;
    private Path licenseModePath;
    private OperationModeFileWatcher operationModeFileWatcher;
    private AtomicReference<CountDownLatch> onChangeCounter;

    @Before
    public void setup() throws Exception {
        threadPool = new TestThreadPool("license mode file watcher tests");
        Settings settings = Settings.builder()
            .put("resource.reload.interval.high", "10ms")
            .build();
        watcherService = new ResourceWatcherService(settings,
            threadPool);
        watcherService.start();
        licenseModePath = createTempFile();
        onChangeCounter = new AtomicReference<>(new CountDownLatch(1));
        operationModeFileWatcher = new OperationModeFileWatcher(watcherService, licenseModePath, logger,
            () -> onChangeCounter.get().countDown());
    }

    @After
    public void shutdown() throws InterruptedException {
        terminate(threadPool);
        watcherService.stop();
    }
}

```

```

public void testInit() throws Exception {
    onChangeCounter.set(new CountdownLatch(2));
    writeMode("gold");
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.init();
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

public void testUpdateModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));
    writeMode("basic");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.BASIC));
}

public void testDeleteModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));

    Files.delete(licenseModePath);
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

public void testInvalidModeFromFile() throws Exception {
    writeMode("invalid");
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

```

```

public void testLicenseModeFileIsDirectory() throws Exception {
    licenseModePath = createTempDir();
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
}

public void testLicenseModeFileCreatedAfterInit() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertThat(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
    onChangeCounter.set(new CountdownLatch(1));
    Path tempFile = createTempFile();
    writeMode("gold", tempFile);
    licenseModePath = tempFile;
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

private void writeMode(String mode) throws IOException {
    writeMode(mode, licenseModePath);
}

static void writeMode(String mode, Path file) throws IOException {
    Files.write(file, mode.getBytes(StandardCharsets.UTF_8), StandardOpenOption.CREATE);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;

import java.util.Locale;

import static org.elasticsearch.license.License.OperationMode;
import static org.hamcrest.Matchers.equalTo;

/**
 * Tests { @link License.OperationMode } for correctness.
 * <p>

```

* If you change the behavior of these tests, then it means that licensing changes across the products!

*/

```
public class LicenseOperationModeTests extends ESTestCase {
    public void testResolveTrial() {
        // assert 1.x BWC
        assertResolve(OperationMode.TRIAL, "nONE", "DEv", "deveLopment");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.TRIAL, "tRiAl", "trial");
    }

    public void testResolveBasic() {
        // assert expected (2.x+) variant (note: no 1.x variant of BASIC)
        assertResolve(OperationMode.BASIC, "bAsIc", "basic");
    }

    public void testResolveStandard() {
        // assert expected (2.x+) variant (note: no 1.x variant of STANDARD)
        assertResolve(OperationMode.STANDARD, "StAnDARd", "standard");
    }

    public void testResolveGold() {
        // assert expected (2.x+) variant (note: no different 1.x variant of GOLD)
        assertResolve(OperationMode.GOLD, "SiLvEr", "gOId", "silver", "gold");
    }

    public void testResolvePlatinum() {
        // assert 1.x BWC
        assertResolve(OperationMode.PLATINUM, "iNtErNaL");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.PLATINUM, "PlAtINum", "platinum");
    }

    public void testResolveUnknown() {
        // 'enterprise' is a type that exists in cloud but should be rejected under normal operation
        // See https://github.com/elastic/x-plugins/issues/3371
        String[] types = { "unknown", "fake", "enterprise" };

        for (String type : types) {
            try {
                OperationMode.resolve(type);

                fail(String.format(Locale.ROOT, "[%s] should not be recognized as an operation mode", type));
            }
            catch (IllegalArgumentException e) {
                assertThat(e.getMessage(), equalTo("unknown type [" + type + "]"));
            }
        }
    }
}
```

```

private static void assertResolve(OperationMode expected, String... types) {
    for (String type : types) {
        assertThat(OperationMode.resolve(type), equalTo(expected));
    }
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;

import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes =
0, transportClientRatio = 0,
    autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return nodeSettingsBuilder(nodeOrdinal).build();
    }

    @Override
    protected boolean addMockHttpTransport() {
        return false;
    }

    private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put("resource.reload.interval.high", "500ms"); // for license mode file watcher
    }
}

```



```

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return nodePlugins();
}

public void testClusterNotRecovered() throws Exception {
    logger.info("--> start one master out of two [recovery state]");
    internalCluster().startNode(nodeSettingsBuilder(0).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
    logger.info("--> start second master out of two [recovered state]");
    internalCluster().startNode(nodeSettingsBuilder(1).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
    assertLicenseActive(true);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterModule;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.metadata.RepositoriesMetaData;
import org.elasticsearch.cluster.metadata.RepositoryMetaData;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContent.Params;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.test.ESTestCase;

import java.util.Collections;
import java.util.UUID;
import java.util.stream.Collectors;
import java.util.stream.Stream;

```

```

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.notNullValue;
import static org.hamcrest.Matchers.nullValue;

public class LicensesMetaDataSerializationTests extends ESTestCase {

    public void testXContentSerializationOneSignedLicense() throws Exception {
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, null);
        XContentBuilder builder = XContentFactory.jsonBuilder();
        builder.startObject();
        builder.startObject("licenses");
        licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
        assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
        assertNull(licensesMetaDataFromXContent.getMostRecentTrialVersion());
    }

    public void testXContentSerializationOneSignedLicenseWithUsedTrial() throws Exception {
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
        XContentBuilder builder = XContentFactory.jsonBuilder();
        builder.startObject();
        builder.startObject("licenses");
        licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
        assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
        assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
    }

    public void testLicenseMetadataParsingDoesNotSwallowOtherMetadata() throws Exception {
        new Licensing(Settings.EMPTY); // makes sure LicensePlugin is registered in Custom Metadata
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
        RepositoryMetaData repositoryMetaData = new RepositoryMetaData("repo", "fs", Settings.EMPTY);
        RepositoriesMetaData repositoriesMetaData = new
RepositoriesMetaData(Collections.singletonList(repositoryMetaData));
        final Metadata.Builder metaDataBuilder = Metadata.builder();
        if (randomBoolean()) { // random order of insertion
            metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
            metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
        }
    }
}

```

```

    } else {
        metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
        metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
    }
    // serialize metadata
    XContentBuilder builder = XContentFactory.jsonBuilder();
    Params params = new
ToXContent.MapParams(Collections.singletonMap(MetaData.CONTEXT_MODE_PARAM,
MetaData.CONTEXT_MODE_GATEWAY));
    builder.startObject();
    builder = metaDataBuilder.build().toXContent(builder, params);
    builder.endObject();
    // deserialize metadata again
    MetaData metaData = MetaData.Builder.fromXContent(createParser(builder));
    // check that custom metadata still present
    assertThat(metaData.custom(licensesMetaData.getWriteableName()), notNullValue());
    assertThat(metaData.custom(repositoriesMetaData.getWriteableName()), notNullValue());
}

```

```

public void testXContentSerializationOneTrial() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .type(randomBoolean() ? "trial" : "basic")
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
    final License trialLicense = SelfGeneratedLicense.create(specBuilder);
    LicensesMetaData licensesMetaData = new LicensesMetaData(trialLicense, Version.CURRENT);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(trialLicense));
    assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

```

```

public void testLicenseTombstoneFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.endObject();
}

```

```

builder.endObject();
LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

public void testLicenseTombstoneWithUsedTrialFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.field("trial_license", Version.CURRENT.toString());
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
    assertEquals(metaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

private static LicensesMetaData getLicensesMetaDataFromXContent(XContentParser parser) throws Exception {
    parser.nextToken(); // consume null
    parser.nextToken(); // consume "licenses"
    LicensesMetaData licensesMetaDataFromXContent = LicensesMetaData.fromXContent(parser);
    parser.nextToken(); // consume endObject
    assertThat(parser.nextToken(), nullValue());
    return licensesMetaDataFromXContent;
}

@Override
protected NamedXContentRegistry xContentRegistry() {
    return new NamedXContentRegistry(Stream.concat(
        new Licensing(Settings.EMPTY).getNamedXContent().stream(),
        ClusterModule.getNamedXWriteables().stream()
    ).collect(Collectors.toList()));
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.settings.Settings;
import org.mockito.ArgumentCaptor;

```

```

import org.mockito.Mockito;

import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseRegistrationTests extends AbstractLicenseServiceTestCase {

    public void testSelfGeneratedTrialLicense() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(null, licenseState, Settings.EMPTY, "trial");
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        licenseService.start();

        ClusterState state = ClusterState.builder(new ClusterName("a")).build();
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
        LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
        assertFalse(licenseMetaData.isEligibleForTrial());
        assertEquals("trial", licenseMetaData.getLicense().type());
        assertEquals(clock.millis() +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis(),
        licenseMetaData.getLicense().expiryDate());
    }

    public void testSelfGeneratedBasicLicense() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(null, licenseState, Settings.EMPTY, "basic");
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        licenseService.start();

        ClusterState state = ClusterState.builder(new ClusterName("a")).build();
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
        LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
        assertTrue(licenseMetaData.isEligibleForTrial());
        assertEquals("basic", licenseMetaData.getLicense().type());
    }
}

```

```

        assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    }

    public void testNonSelfGeneratedBasicLicenseIsReplaced() throws Exception {
        long now = System.currentTimeMillis();
        String uid = UUID.randomUUID().toString();
        final License.Builder builder = License.builder()
            .uid(uid)
            .version(License.VERSION_CURRENT)
            .expiryDate(dateMath("now+2h", now))
            .startDate(now)
            .issueDate(now)
            .type("basic")
            .issuedTo("customer")
            .issuer("elasticsearch")
            .maxNodes(5);
        License license = TestUtils.generateSignedLicense(builder);

        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(license, licenseState, Settings.EMPTY);
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        licenseService.start();

        Metadata.Builder mdBuilder = Metadata.builder();
        mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
        ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
        LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
        assertTrue(licenseMetaData.isEligibleForTrial());
        assertEquals("basic", licenseMetaData.getLicense().type());
        assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
        assertEquals(uid, licenseMetaData.getLicense().uid());
    }

    public void testExpiredSelfGeneratedBasicLicenseIsExtended() throws Exception {
        long now = System.currentTimeMillis();
        String uid = UUID.randomUUID().toString();
        License.Builder builder = License.builder()
            .uid(uid)
            .issuedTo("name")
            .maxNodes(1000)

```

```

        .issueDate(dateMath("now-10h", now))
        .type("basic")
        .expiryDate(dateMath("now-2h", now));
License license = SelfGeneratedLicense.create(builder);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    assertEquals(uid, licenseMetaData.getLicense().uid());
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import java.util.UUID;

```

```

import static org.elasticsearch.license.CryptUtils.encryptV3Format;
import static org.hamcrest.Matchers.equalTo;

public class SelfGeneratedLicenseTests extends ESTestCase {

    public void testBasic() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .maxNodes(5)
            .type(randomBoolean() ? "trial" : "basic")
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder);
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
    }

    public void testTampered() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .type(randomBoolean() ? "trial" : "basic")
            .maxNodes(5)
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder);
        final String originalSignature = trialLicense.signature();
        License tamperedLicense = License.builder().fromLicenseSpec(trialLicense, originalSignature)
            .expiryDate(System.currentTimeMillis() + TimeValue.timeValueHours(5).getMillis())
            .build();
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
        assertThat(SelfGeneratedLicense.verify(tamperedLicense), equalTo(false));
    }

    public void testFrom1x() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .type("subscription")
            .subscriptionType("trial")
            .issuer("elasticsearch")
            .feature("")
            .version(License.VERSION_START)
            .maxNodes(5)

```



```

        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License pre20TrialLicense = specBuilder.build();
License license =
SelfGeneratedLicense.create(License.builder().fromPre20LicenseSpec(pre20TrialLicense).type("trial"));
    assertThat(SelfGeneratedLicense.verify(license), equalTo(true));
}

public void testTrialLicenseVerifyWithOlderVersion() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis())
        .feature("")
        .subscriptionType("trial")
        .version(1);
    License trialLicenseV1 = createTrialLicense(specBuilder);
    assertThat(SelfGeneratedLicense.verify(trialLicenseV1), equalTo(true));
}

private static License createTrialLicense(License.Builder specBuilder) {
    License spec = specBuilder
        .type(randomBoolean() ? "trial" : "basic")
        .issuer("elasticsearch")
        .uid(UUID.randomUUID().toString())
        .build();
    final String signature;
    try {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        byte[] encrypt = encryptV3Format(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        byte[] bytes = new byte[4 + 4 + encrypt.length];
        ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
        byteBuffer.putInt(-spec.version())
            .putInt(encrypt.length)
            .put(encrypt);
        signature = Base64.getEncoder().encodeToString(bytes);
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
    return License.builder().fromLicenseSpec(spec, signature).build();
}
}
/*
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```

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*/

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.action.ActionFuture;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
```

```
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import java.util.UUID;
```

```
import static org.elasticsearch.license.TestUtils.dateMath;
import static org.elasticsearch.license.TestUtils.generateExpiredNonBasicLicense;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.not;
```

```
public class LicensesTransportTests extends ESSingleNodeTestCase {
```

```
    @Override
```

```
    protected boolean resetNodeAfterTest() {
        return true;
    }
```

```
    @Override
```

```
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }
```

```
    @Override
```

```
    protected Settings nodeSettings() {
        Settings.Builder newSettings = Settings.builder();
        newSettings.put(super.nodeSettings());
        newSettings.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
        // newSettings.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
        // newSettings.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
        newSettings.put(Node.NODE_DATA_SETTING.getKey(), true);
        return newSettings.build();
    }
```

```

}

public void testEmptyGetLicense() throws Exception {
    // basic license is added async, we should wait for it
    assertBusy(() -> {
        try {
            final ActionFuture<GetLicenseResponse> getLicenseFuture =
                new GetLicenseRequestBuilder(client().admin().cluster(), GetLicenseAction.INSTANCE).execute();
            final GetLicenseResponse getLicenseResponse;
            getLicenseResponse = getLicenseFuture.get();
            assertNotNull(getLicenseResponse.license());
            assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
        } catch (Exception e) {
            throw new RuntimeException("unexpected exception", e);
        }
    });
}

public void testPutLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // put license
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
        PutLicenseAction.INSTANCE).setLicense(signedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
    GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutLicenseFromString() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
    String licenseString = TestUtils.dumpLicense(signedLicense);

    // put license source
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE)
        .setLicense(new ByteArray(licenseString.getBytes(StandardCharsets.UTF_8)),
    XContentType.JSON)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
}

```

```

assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

// get and check license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutInvalidLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(tamperedLicense);

    // try to put license (should be invalid)
    final PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(tamperedLicense));
}

public void testPutBasicLicenseIsInvalid() throws Exception {
    License signedLicense = generateSignedLicense("basic", License.VERSION_CURRENT, -1,
TimeValue.timeValueMinutes(2));

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(signedLicense);

    // try to put license (should be invalid)
    IllegalArgumentException iae = expectThrows(IllegalArgumentException.class, builder::get);
    assertEquals(iae.getMessage(), "Registering basic licenses is not allowed.");

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(signedLicense));
}

```

```

}

public void testPutExpiredLicense() throws Exception {
    License expiredLicense = generateExpiredNonBasicLicense();
    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(expiredLicense);
    PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.EXPIRED));
    // get license should not return the expired license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(expiredLicense));
}

public void testPutLicensesSimple() throws Exception {
    License goldSignedLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldSignedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(goldSignedLicense));

    License platinumSignedLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(2));
    putLicenseRequestBuilder.setLicense(platinumSignedLicense);
    putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(platinumSignedLicense));
}

public void testRemoveLicensesSimple() throws Exception {
    License goldLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();

```

```

assertThat(getLicenseResponse.license(), equalTo(goldLicense));
// delete all licenses
DeleteLicenseRequestBuilder deleteLicenseRequestBuilder =
    new DeleteLicenseRequestBuilder(client().admin().cluster(), DeleteLicenseAction.INSTANCE);
DeleteLicenseResponse deleteLicenseResponse = deleteLicenseRequestBuilder.get();
assertThat(deleteLicenseResponse.isAcknowledged(), equalTo(true));
// get licenses (expected no licenses)
getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertNull(getLicenseResponse.license());
}

```

```

public void testLicenseIsRejectWhenStartDateLaterThanNow() throws Exception {
    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(dateMath("now+1h", now))
        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);

    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
        .setAcknowledged(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));
}

```

```

public void testLicenseIsAcceptedWhenStartDateBeforeThanNow() throws Exception {
    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(now)
        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);

```

```

    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
            .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.unit.TimeValue;

import java.net.InetAddress;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicenseTLSTests extends AbstractLicenseServiceTestCase {

    private InetAddress inetAddress;

    public void testApplyLicenseInDevMode() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "platinum"),
TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();
        request.acknowledge(true);
        request.license(newLicense);
        Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
        XPackLicenseState licenseState = new XPackLicenseState(settings);
        inetAddress = InetAddress.getLoopbackAddress();

```

```

setInitialState(null, licenseState, settings);
licenseService.start();
PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
licenseService.registerLicense(request, responseFuture);
verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

inetAddress = TransportAddress.META_ADDRESS;
settings = Settings.builder()
    .put("xpack.security.enabled", true)
    .put("discovery.type", "single-node")
    .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testApplyLicenseInProdMode() throws Exception {
    final String licenseType = randomFrom("GOLD", "PLATINUM");
    License newLicense = TestUtils.generateSignedLicense(licenseType, TimeValue.timeValueHours(24L));
    PutLicenseRequest request = new PutLicenseRequest();
    request.acknowledge(true);
    request.license(newLicense);
    Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
    XPackLicenseState licenseState = new XPackLicenseState(settings);
    inetAddress = TransportAddress.META_ADDRESS;

    setInitialState(null, licenseState, settings);
    licenseService.start();
    PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
    IllegalStateException e = expectThrows(IllegalStateException.class, () ->
licenseService.registerLicense(request, responseFuture));
    assertThat(e.getMessage(),
        containsString("Cannot install a [" + licenseType + "] license unless TLS is configured or security is
disabled"));

    settings = Settings.builder().put("xpack.security.enabled", false).build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
    licenseService.start();
    licenseService.registerLicense(request, responseFuture);
    verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    settings = Settings.builder()
        .put("xpack.security.enabled", true)

```



```

        .put("xpack.security.transport.ssl.enabled", true)
        .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

@Override
protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("localnode", new TransportAddress(inetAddress, randomIntBetween(9300, 9399)),
        emptyMap(), emptySet(), Version.CURRENT);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.ByteArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.nio.charset.StandardCharsets;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;

import static org.hamcrest.core.IsEqual.equalTo;
import static org.hamcrest.core.IsNull.notNullValue;
import static org.hamcrest.core.IsNull.nullValue;

public class LicenseSerializationTests extends ESTestCase {
    public void testSimpleIssueExpiryDate() throws Exception {
        long now = System.currentTimeMillis();
        String issueDate = TestUtils.dateMathString("now", now);
        String expiryDate = TestUtils.dateMathString("now+10d/d", now);
        String licenseSpecs = TestUtils.generateLicenseSpecString(new TestUtils.LicenseSpec(issueDate, expiryDate));
        License generatedLicense = License.fromSource(new

```

```

ByteArray(licenseSpecs.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
    assertThat(generatedLicense.issueDate(), equalTo(DateUtils.beginningOfDay(issueDate)));
    assertThat(generatedLicense.expiryDate(), equalTo(DateUtils.endOfDay(expiryDate)));
}

public void testLicensesFields() throws Exception {
    TestUtils.LicenseSpec randomLicenseSpec =
TestUtils.generateRandomLicenseSpec(License.VERSION_START);
    String licenseSpecsSource = TestUtils.generateLicenseSpecString(randomLicenseSpec);
    final License fromSource =
        License.fromSource(new ByteArray(licenseSpecsSource.getBytes(StandardCharsets.UTF_8)),
XContentType.JSON);
    TestUtils.assertLicenseSpec(randomLicenseSpec, fromSource);
}

public void testLicenseRestView() throws Exception {
    long now = System.currentTimeMillis();
    String expiredLicenseExpiryDate = TestUtils.dateMathString("now-1d/d", now);
    String validLicenseIssueDate = TestUtils.dateMathString("now-10d/d", now);
    String invalidLicenseIssueDate = TestUtils.dateMathString("now+1d/d", now);
    String validLicenseExpiryDate = TestUtils.dateMathString("now+2d/d", now);

    License license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
expiredLicenseExpiryDate));
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType().v2());

    // should have an extra status field, human readable issue_date and expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), notNullValue());
    assertThat(map.get("status"), equalTo("expired"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
    assertThat(map.get("status"), nullValue());

    license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
validLicenseExpiryDate));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();

```

```

map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());

// should have an extra status field, human readable issue_data and expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), notNullValue());
assertThat(map.get("status"), equalTo("active"));
builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
assertThat(map.get("status"), nullValue());

license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(invalidLicenseIssueDate,
validLicenseExpiryDate));
builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());

// should have an extra status field, human readable issue_data and expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), notNullValue());
assertThat(map.get("status"), equalTo("invalid"));
builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
assertThat(map.get("status"), nullValue());
}

public void testLicenseRestViewNonExpiringBasic() throws Exception {
    long now = System.currentTimeMillis();

    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("test")
        .maxNodes(1000)
        .issueDate(now)
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License license = SelfGeneratedLicense.create(specBuilder);
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();

```

```
Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();
```

```
    // should have an extra status field, human readable issue_data and no expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("type"), equalTo("basic"));
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), nullValue());
    assertThat(map.get("expiry_date_in_millis"), nullValue());
    assertThat(map.get("status"), equalTo("active"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
    assertThat(map.get("status"), nullValue());
```

```
    }
}
/*
```

```
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
```

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
```

```
import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;
```

```
import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;
```

```
@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartBasicLicenseTests extends AbstractLicensesIntegrationTestCase {
```

```
    @Override
```

```

protected boolean addMockHttpTransport() {
    return false; // enable http
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put("node.data", true)
        .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic").build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
}

public void testStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
    licensingClient.preparePutLicense(license).get();

    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("trial", getLicenseResponse.license().type());
    });

    // Testing that you can start a basic license when you have no license
    if (randomBoolean()) {
        licensingClient.prepareDeleteLicense().get();
        assertNull(licensingClient.prepareGetLicense().get().license());
    }

    RestClient restClient = getRestClient();
    Response response = restClient.performRequest("GET", "/_xpack/license/basic_status");
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response.getStatusLine().getStatusCode());
    assertEquals("{\"eligible_to_start_basic\":true}", body);

    Response response2 = restClient.performRequest("POST", "/_xpack/license/start_basic?acknowledge=true");
    String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),

```

```

StandardCharsets.UTF_8));
    assertEquals(200, response2.getStatusLine().getStatusCode());
    assertTrue(body2.contains("\"acknowledged\":true"));
    assertTrue(body2.contains("\"basic_was_started\":true"));

    assertBusy(() -> {
        GetLicenseResponse currentLicense = licensingClient.prepareGetLicense().get();
        assertEquals("basic", currentLicense.license().type());
    });

    long expirationMillis = licensingClient.prepareGetLicense().get().license().expiryDate();
    assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
expirationMillis);

    Response response3 = restClient.performRequest("GET", "/_xpack/license");
    String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertTrue(body3.contains("\"type\" : \"basic\""));
    assertFalse(body3.contains("expiry_date"));
    assertFalse(body3.contains("expiry_date_in_millis"));

    Response response4 = restClient.performRequest("GET", "/_xpack/license/basic_status");
    String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response3.getStatusLine().getStatusCode());
    assertEquals("{\"eligible_to_start_basic\":false}", body4);

    ResponseException ex = expectThrows(ResponseException.class,
        () -> restClient.performRequest("POST", "/_xpack/license/start_basic"));
    Response response5 = ex.getResponse();
    String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(403, response5.getStatusLine().getStatusCode());
    assertTrue(body5.contains("\"basic_was_started\":false"));
    assertTrue(body5.contains("\"acknowledged\":true"));
    assertTrue(body5.contains("\"error_message\": \"Operation failed: Current license is basic.\""));
}

public void testUnacknowledgedStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
    licensingClient.preparePutLicense(license).get();

    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("trial", getLicenseResponse.license().type());
    });
}

```

```

});

Response response2 = getRestClient().performRequest("POST", "/_xpack/license/start_basic");
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"acknowledged\":false"));
assertTrue(body2.contains("\"basic_was_started\":false"));
assertTrue(body2.contains("\"error_message\": \"Operation failed: Needs acknowledgement.\""));
assertTrue(body2.contains("\"message\": \"This license update requires acknowledgement. To acknowledge the
license, " +
    "please read the following messages and call /start_basic again, this time with the
    \\\"acknowledge=true\\\""));
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.BytesStreamOutput;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.hamcrest.Matchers.sameInstance;

public class PutLicenseResponseTests extends ESTestCase {
    @SuppressWarnings("unchecked")
    public void testSerialization() throws Exception {
        boolean acknowledged = randomBoolean();
        LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
        Map<String, String[]> ackMessages = randomAckMessages();

```

```

PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);

XContentBuilder contentBuilder = XContentFactory.jsonBuilder();
response.toXContent(contentBuilder, ToXContent.EMPTY_PARAMS);

Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(contentBuilder), false,
    contentBuilder.contentType()).v2();
assertThat(map.containsKey("acknowledged"), equalTo(true));
boolean actualAcknowledged = (boolean) map.get("acknowledged");
assertThat(actualAcknowledged, equalTo(acknowledged));

assertThat(map.containsKey("license_status"), equalTo(true));
String actualStatus = (String) map.get("license_status");
assertThat(actualStatus, equalTo(status.name().toLowerCase(Locale.ROOT)));

assertThat(map.containsKey("acknowledge"), equalTo(true));
Map<String, List<String>> actualAckMessages = (Map<String, List<String>>) map.get("acknowledge");
assertTrue(actualAckMessages.containsKey("message"));
actualAckMessages.remove("message");
assertThat(actualAckMessages.keySet(), equalTo(ackMessages.keySet()));
for (Map.Entry<String, List<String>> entry : actualAckMessages.entrySet()) {
    assertThat(entry.getValue().toArray(), equalTo(ackMessages.get(entry.getKey())));
}
}

public void testStreamSerialization() throws IOException {
    boolean acknowledged = randomBoolean();
    LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
    Map<String, String[]> ackMessages = randomAckMessages();

    // write the steam so that we can attempt to read it back
    ByteArrayOutputStream output = new ByteArrayOutputStream();

    PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);
    // write it out
    response.writeTo(output);

    StreamInput input = output.bytes().streamInput();

    // read it back in
    response.readFrom(input);

    assertThat(response.isAcknowledged(), equalTo(acknowledged));
    assertThat(response.status(), equalTo(status));
    assertThat(response.acknowledgeMessages(), not(sameInstance(ackMessages)));
    assertThat(response.acknowledgeMessages().size(), equalTo(ackMessages.size()));
}

```



```

    for (String key : ackMessages.keySet()) {
        assertEquals(ackMessages.get(key), response.acknowledgeMessages().get(key));
    }
}

private static Map<String, String[]> randomAckMessages() {
    int nFeatures = randomIntBetween(1, 5);

    Map<String, String[]> ackMessages = new HashMap<>();

    for (int i = 0; i < nFeatures; i++) {
        String feature = randomAlphaOfLengthBetween(9, 15);
        int nMessages = randomIntBetween(1, 5);
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = randomAlphaOfLengthBetween(10, 30);
        }
        ackMessages.put(feature, messages);
    }

    return ackMessages;
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlocks;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.watcher.watch.ClockMock;
import org.junit.After;
import org.junit.Before;

```

```

import java.nio.file.Path;
import java.util.Arrays;

import static java.util.Collections.emptySet;
import static java.util.Collections.singletonMap;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

public abstract class AbstractLicenseServiceTestCase extends ESTestCase {

    protected LicenseService licenseService;
    protected ClusterService clusterService;
    protected ResourceWatcherService resourceWatcherService;
    protected ClockMock clock;
    protected DiscoveryNodes discoveryNodes;
    protected Environment environment;
    protected String licenseType;

    @Before
    public void init() throws Exception {
        clusterService = mock(ClusterService.class);
        clock = ClockMock.frozen();
        discoveryNodes = mock(DiscoveryNodes.class);
        resourceWatcherService = mock(ResourceWatcherService.class);
        environment = mock(Environment.class);
    }

    protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings) {
        setInitialState(license, licenseState, settings, randomBoolean() ? "trial" : "basic");
    }

    protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings, String
selfGeneratedType) {
        Path tempDir = createTempDir();
        when(environment.configFile()).thenReturn(tempDir);
        licenseType = selfGeneratedType;
        settings =
Settings.builder().put(settings).put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(),
licenseType).build();
        licenseService = new LicenseService(settings, clusterService, clock, environment, resourceWatcherService,
licenseState);
        ClusterState state = mock(ClusterState.class);
        final ClusterBlocks noBlock = ClusterBlocks.builder().build();
        when(state.blocks()).thenReturn(noBlock);
        Metadata metaData = mock(Metadata.class);
        when(metaData.custom(LicensesMetaData.TYPE)).thenReturn(new LicensesMetaData(license, null));
        when(state.metaData()).thenReturn(metaData);
    }
}

```

```

    final DiscoveryNode mockNode = getLocalNode();
    when(discoveryNodes.getMasterNode()).thenReturn(mockNode);
    when(discoveryNodes.spliterator()).thenReturn(Arrays.asList(mockNode).spliterator());
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(false);
    when(state.nodes()).thenReturn(discoveryNodes);
    when(state.getNodes()).thenReturn(discoveryNodes); // it is really ridiculous we have nodes() and getNodes()...
    when(clusterService.state()).thenReturn(state);
    when(clusterService.lifecycleState()).thenReturn(Lifecycle.State.STARTED);
    when(clusterService.getClusterName()).thenReturn(new ClusterName("a"));
    when(clusterService.localNode()).thenReturn(mockNode);
}

protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("b", buildNewFakeTransportAddress(),
    singletonMap(XPackPlugin.XPACK_INSTALLED_NODE_ATTR, "true"),
    emptySet(), Version.CURRENT);
}

@After
public void tearDown() throws Exception {
    super.tearDown();
    licenseService.stop();
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.function.Predicate;

/**
 * A permissions that is based on a general privilege that contains patterns of users that this
 * user can execute a request as
 */
public final class RunAsPermission {

    public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

    private final Predicate<String> predicate;

    RunAsPermission(Privilege privilege) {
        this.predicate = privilege.predicate();
    }
}

```

```

/**
 * Checks if this permission grants run as to the specified user
 */
public boolean check(String username) {
    return predicate.test(username);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;

public final class Role {

    public static final Role EMPTY = Role.builder("__empty").build();

    private final String[] names;
    private final ClusterPermission cluster;
    private final IndicesPermission indices;
    private final RunAsPermission runAs;

    Role(String[] names, ClusterPermission cluster, IndicesPermission indices, RunAsPermission runAs) {
        this.names = names;
        this.cluster = Objects.requireNonNull(cluster);
        this.indices = Objects.requireNonNull(indices);
        this.runAs = Objects.requireNonNull(runAs);
    }
}

```

```

public String[] names() {
    return names;
}

public ClusterPermission cluster() {
    return cluster;
}

public IndicesPermission indices() {
    return indices;
}

public RunAsPermission runAs() {
    return runAs;
}

public static Builder builder(String... names) {
    return new Builder(names, null);
}

public static Builder builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(names, fieldPermissionsCache);
}

public static Builder builder(RoleDescriptor rd, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(rd, fieldPermissionsCache);
}

/**
 * Returns whether at least one group encapsulated by this indices permissions is authorized to execute the
 * specified action with the requested indices/aliases. At the same time if field and/or document level security
 * is configured for any group also the allowed fields and role queries are resolved.
 */
public IndicesAccessControl authorize(String action, Set<String> requestedIndicesOrAliases, MetaData
metaData,
                                FieldPermissionsCache fieldPermissionsCache) {
    Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = indices.authorize(
        action, requestedIndicesOrAliases, metaData, fieldPermissionsCache
    );

    // At least one role / indices permission set need to match with all the requested indices/aliases:
    boolean granted = true;
    for (Map.Entry<String, IndicesAccessControl.IndexAccessControl> entry : indexPermissions.entrySet()) {
        if (!entry.getValue().isGranted()) {
            granted = false;
            break;
        }
    }
}

```

```

return new IndicesAccessControl(Granted, indexPermissions);
}

public static class Builder {

    private final String[] names;
    private ClusterPermission cluster = ClusterPermission.NONE;
    private RunAsPermission runAs = RunAsPermission.NONE;
    private List<IndicesPermission.Group> groups = new ArrayList<>();
    private FieldPermissionsCache fieldPermissionsCache = null;

    private Builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
        this.names = names;
        this.fieldPermissionsCache = fieldPermissionsCache;
    }

    private Builder(RoleDescriptor rd, @Nullable FieldPermissionsCache fieldPermissionsCache) {
        this.names = new String[] { rd.getName() };
        this.fieldPermissionsCache = fieldPermissionsCache;
        if (rd.getClusterPrivileges().length == 0) {
            cluster = ClusterPermission.NONE;
        } else {
            this.cluster(ClusterPrivilege.get(Sets.newHashSet(rd.getClusterPrivileges())));
        }
        groups.addAll(convertFromIndicesPrivileges(rd.getIndicesPrivileges(), fieldPermissionsCache));
        String[] rdRunAs = rd.getRunAs();
        if (rdRunAs != null && rdRunAs.length > 0) {
            this.runAs(new Privilege(Sets.newHashSet(rdRunAs), rdRunAs));
        }
    }

    public Builder cluster(ClusterPrivilege privilege) {
        cluster = new ClusterPermission(privilege);
        return this;
    }

    public Builder runAs(Privilege privilege) {
        runAs = new RunAsPermission(privilege);
        return this;
    }

    public Builder add(IndexPrivilege privilege, String... indices) {
        groups.add(new IndicesPermission.Group(privilege, FieldPermissions.DEFAULT, null, indices));
        return this;
    }

    public Builder add(FieldPermissions fieldPermissions, Set<BytesReference> query, IndexPrivilege privilege,
String... indices) {

```

```

        groups.add(new IndicesPermission.Group(privilege, fieldPermissions, query, indices));
        return this;
    }

    public Role build() {
        IndicesPermission indices = groups.isEmpty() ? IndicesPermission.NONE :
            new IndicesPermission(groups.toArray(new IndicesPermission.Group[groups.size()]));
        return new Role(names, cluster, indices, runAs);
    }

    static List<IndicesPermission.Group> convertFromIndicesPrivileges(RoleDescriptor.IndicesPrivileges[]
indicesPrivileges,
                                                                    @Nullable FieldPermissionsCache fieldPermissionsCache) {
        List<IndicesPermission.Group> list = new ArrayList<>(indicesPrivileges.length);
        for (RoleDescriptor.IndicesPrivileges privilege : indicesPrivileges) {
            final FieldPermissions fieldPermissions;
            if (fieldPermissionsCache != null) {
                fieldPermissions = fieldPermissionsCache.getFieldPermissions(privilege.getGrantedFields(),
privilege.getDeniedFields());
            } else {
                fieldPermissions = new FieldPermissions(
                    new FieldPermissionsDefinition(privilege.getGrantedFields(), privilege.getDeniedFields()));
            }
            final Set<BytesReference> query = privilege.getQuery() == null ? null :
Collections.singleton(privilege.getQuery());
            list.add(new IndicesPermission.Group(IndexPrivilege.get(Sets.newHashSet(privilege.getPrivileges())),
                fieldPermissions,
                query,
                privilege.getIndices()));
        }
        return list;
    }
}
}
}
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*/
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.common.cache.Cache;
import org.elasticsearch.common.cache.CacheBuilder;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Setting.Property;

```

```

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.Collection;
import java.util.List;
import java.util.Optional;
import java.util.Set;
import java.util.concurrent.ExecutionException;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.xpack.core.security.SecurityField.setting;

/**
 * A service for managing the caching of {@link FieldPermissions} as these may often need to be combined or
 * created and internally they
 * use an {@link org.apache.lucene.util.automaton.Automaton}, which can be costly to create once you account for
 * minimization
 */
public final class FieldPermissionsCache {

    public static final Setting<Long> CACHE_SIZE_SETTING = Setting.longSetting(
        setting("authz.store.roles.field_permissions.cache.max_size_in_bytes"), 100 * 1024 * 1024, -1L,
        Property.NodeScope);
    private final Cache<FieldPermissionsDefinition, FieldPermissions> cache;

    public FieldPermissionsCache(Settings settings) {
        this.cache = CacheBuilder.<FieldPermissionsDefinition, FieldPermissions>builder()
            .setMaximumWeight(CACHE_SIZE_SETTING.get(settings))
            .weigher((key, fieldPermissions) -> fieldPermissions.ramBytesUsed())
            .build();
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
     * may come from the cache
     * or if it gets created, the instance will be cached
     */
    FieldPermissions getFieldPermissions(String[] granted, String[] denied) {
        return getFieldPermissions(new FieldPermissionsDefinition(granted, denied));
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
     * may come from the cache
     * or if it gets created, the instance will be cached
     */

```



```

public FieldPermissions getFieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
    try {
        return cache.computeIfAbsent(fieldPermissionsDefinition,
            (key) -> new FieldPermissions(key, FieldPermissions.initializePermittedFieldsAutomaton(key)));
    } catch (ExecutionException e) {
        throw new ElasticsearchException("unable to compute field permissions", e);
    }
}

/**
 * Returns a field permissions object that corresponds to the merging of the given field permissions and caches the
instance if one was
 * not found in the cache.
 */
FieldPermissions getFieldPermissions(Collection<FieldPermissions> fieldPermissionsCollection) {
    Optional<FieldPermissions> allowAllFieldPermissions = fieldPermissionsCollection.stream()
        .filter(((Predicate<FieldPermissions>) (FieldPermissions::hasFieldLevelSecurity)).negate())
        .findFirst();
    return allowAllFieldPermissions.orElseGet(() -> {
        final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups = fieldPermissionsCollection.stream()
            .flatMap(fieldPermission ->
fieldPermission.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream())
            .collect(Collectors.toSet());
        final FieldPermissionsDefinition combined = new FieldPermissionsDefinition(fieldGrantExcludeGroups);
        try {
            return cache.computeIfAbsent(combined, (key) -> {
                List<Automaton> automatonList = fieldPermissionsCollection.stream()
                    .map(FieldPermissions::getIncludeAutomaton)
                    .collect(Collectors.toList());
                return new FieldPermissions(key, Automatons.unionAndMinimize(automatonList));
            });
        } catch (ExecutionException e) {
            throw new ElasticsearchException("unable to compute field permissions", e);
        }
    });
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.TooComplexToDeterminizeException;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.cluster.metadata.AliasOrIndex;

```

```

import org.elasticsearch.cluster.metadata.IndexMetaData;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.Iterator;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;
import java.util.SortedMap;
import java.util.concurrent.ConcurrentHashMap;
import java.util.function.Function;
import java.util.function.Predicate;

import static java.util.Collections.unmodifiableMap;
import static java.util.Collections.unmodifiableSet;

/**
 * A permission that is based on privileges for index related actions executed
 * on specific indices
 */
public final class IndicesPermission implements Iterable<IndicesPermission.Group> {

    public static final IndicesPermission NONE = new IndicesPermission();

    private final Function<String, Predicate<String>> loadingFunction;

    private final ConcurrentHashMap<String, Predicate<String>> allowedIndicesMatchersForAction = new
    ConcurrentHashMap<>();

    private final Group[] groups;

    public IndicesPermission(Group... groups) {
        this.groups = groups;
        loadingFunction = (action) -> {
            List<String> indices = new ArrayList<>();
            for (Group group : groups) {
                if (group.actionMatcher.test(action)) {

```

```

        indices.addAll(Arrays.asList(group.indices));
    }
}
return indexMatcher(indices);
};
}

static Predicate<String> indexMatcher(List<String> indices) {
    try {
        return Automaton.predicate(indices);
    } catch (TooComplexToDeterminizeException e) {
        Loggers.getLogger(IndicesPermission.class).debug("Index pattern automaton [{}] is too complex", indices);
        String description = Strings.collectionToCommaDelimitedString(indices);
        if (description.length() > 80) {
            description = Strings.cleanTruncate(description, 80) + "...";
        }
        throw new ElasticsearchSecurityException("The set of permitted index patterns [{}] is too complex to
evaluate", e, description);
    }
}

@Override
public Iterator<Group> iterator() {
    return Arrays.asList(groups).iterator();
}

public Group[] groups() {
    return groups;
}

/**
 * @return A predicate that will match all the indices that this permission
 * has the privilege for executing the given action on.
 */
public Predicate<String> allowedIndicesMatcher(String action) {
    return allowedIndicesMatchersForAction.computeIfAbsent(action, loadingFunction);
}

/**
 * Checks if the permission matches the provided action, without looking at indices.
 * To be used in very specific cases where indices actions need to be authorized regardless of their indices.
 * The usecase for this is composite actions that are initially only authorized based on the action name (indices are
not
 * checked on the coordinating node), and properly authorized later at the shard level checking their indices as
well.
 */
public boolean check(String action) {
    for (Group group : groups) {

```

```

        if (group.check(action)) {
            return true;
        }
    }
    return false;
}

public Automaton allowedActionsMatcher(String index) {
    List<Automaton> automatonList = new ArrayList<>();
    for (Group group : groups) {
        if (group.indexNameMatcher.test(index)) {
            automatonList.add(group.privilege.getAutomaton());
        }
    }
    return automatonList.isEmpty() ? Automaton.EMPTY : Automaton.unionAndMinimize(automatonList);
}

/**
 * Authorizes the provided action against the provided indices, given the current cluster metadata
 */
public Map<String, IndicesAccessControl.IndexAccessControl> authorize(String action, Set<String>
requestedIndicesOrAliases,
                                Metadata metaData, FieldPermissionsCache fieldPermissionsCache) {
    // now... every index that is associated with the request, must be granted
    // by at least one indices permission group

    SortedMap<String, AliasOrIndex> allAliasesAndIndices = metaData.getAliasAndIndexLookup();
    Map<String, Set<FieldPermissions>> fieldPermissionsByIndex = new HashMap<>();
    Map<String, DocumentLevelPermissions> roleQueriesByIndex = new HashMap<>();
    Map<String, Boolean> grantedBuilder = new HashMap<>();

    for (String indexOrAlias : requestedIndicesOrAliases) {
        boolean granted = false;
        Set<String> concreteIndices = new HashSet<>();
        AliasOrIndex aliasOrIndex = allAliasesAndIndices.get(indexOrAlias);
        if (aliasOrIndex != null) {
            for (IndexMetaData indexMetaData : aliasOrIndex.getIndices()) {
                concreteIndices.add(indexMetaData.getIndex().getName());
            }
        }

        for (Group group : groups) {
            if (group.check(action, indexOrAlias)) {
                granted = true;
                for (String index : concreteIndices) {
                    Set<FieldPermissions> fieldPermissions = fieldPermissionsByIndex.computeIfAbsent(index, (k) ->
new HashSet<>());
                    fieldPermissionsByIndex.put(indexOrAlias, fieldPermissions);
                }
            }
        }
    }
}

```

```

        fieldPermissions.add(group.getFieldPermissions());
        DocumentLevelPermissions permissions =
            roleQueriesByIndex.computeIfAbsent(index, (k) -> new DocumentLevelPermissions());
        roleQueriesByIndex.putIfAbsent(indexOrAlias, permissions);
        if (group.hasQuery()) {
            permissions.addAll(group.getQuery());
        } else {
            // if more than one permission matches for a concrete index here and if
            // a single permission doesn't have a role query then DLS will not be
            // applied even when other permissions do have a role query
            permissions.setAllowAll(true);
        }
    }
}

if (concreteIndices.isEmpty()) {
    grantedBuilder.put(indexOrAlias, granted);
} else {
    grantedBuilder.put(indexOrAlias, granted);
    for (String concreteIndex : concreteIndices) {
        grantedBuilder.put(concreteIndex, granted);
    }
}
}

Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = new HashMap<>();
for (Map.Entry<String, Boolean> entry : grantedBuilder.entrySet()) {
    String index = entry.getKey();
    DocumentLevelPermissions permissions = roleQueriesByIndex.get(index);
    final Set<BytesReference> roleQueries;
    if (permissions != null && permissions.isAllowAll() == false) {
        roleQueries = unmodifiableSet(permissions.queries);
    } else {
        roleQueries = null;
    }

    final FieldPermissions fieldPermissions;
    final Set<FieldPermissions> indexFieldPermissions = fieldPermissionsByIndex.get(index);
    if (indexFieldPermissions != null && indexFieldPermissions.isEmpty() == false) {
        fieldPermissions = indexFieldPermissions.size() == 1 ? indexFieldPermissions.iterator().next() :
            fieldPermissionsCache.getFieldPermissions(indexFieldPermissions);
    } else {
        fieldPermissions = FieldPermissions.DEFAULT;
    }
    indexPermissions.put(index, new IndicesAccessControl.IndexAccessControl(entry.getValue(),
        fieldPermissions, roleQueries));
}

```

```

        return unmodifiableMap(indexPermissions);
    }

    public static class Group {
        private final IndexPrivilege privilege;
        private final Predicate<String> actionMatcher;
        private final String[] indices;
        private final Predicate<String> indexNameMatcher;

        public FieldPermissions getFieldPermissions() {
            return fieldPermissions;
        }

        private final FieldPermissions fieldPermissions;
        private final Set<BytesReference> query;

        public Group(IndexPrivilege privilege, FieldPermissions fieldPermissions, @Nullable Set<BytesReference>
query, String... indices) {
            assert indices.length != 0;
            this.privilege = privilege;
            this.actionMatcher = privilege.predicate();
            this.indices = indices;
            this.indexNameMatcher = indexMatcher(Arrays.asList(indices));
            this.fieldPermissions = Objects.requireNonNull(fieldPermissions);
            this.query = query;
        }

        public IndexPrivilege privilege() {
            return privilege;
        }

        public String[] indices() {
            return indices;
        }

        @Nullable
        public Set<BytesReference> getQuery() {
            return query;
        }

        private boolean check(String action) {
            return actionMatcher.test(action);
        }

        private boolean check(String action, String index) {
            assert index != null;
            return check(action) && indexNameMatcher.test(index);
        }
    }

```

```

    boolean hasQuery() {
        return query != null;
    }
}

private static class DocumentLevelPermissions {

    private Set<BytesReference> queries = null;
    private boolean allowAll = false;

    private void addAll(Set<BytesReference> query) {
        if (allowAll == false) {
            if (queries == null) {
                queries = new HashSet<>();
            }
            queries.addAll(query);
        }
    }

    private boolean isAllowAll() {
        return allowAll;
    }

    private void setAllowAll(boolean allowAll) {
        this.allowAll = allowAll;
    }
}
}
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.index.DirectoryReader;
import org.apache.lucene.util.Accountable;
import org.apache.lucene.util.RamUsageEstimator;
import org.apache.lucene.util.automaton.Automata;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.CharacterRunAutomaton;
import org.apache.lucene.util.automaton.MinimizationOperations;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.regex.Regex;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.FieldSubsetReader;

```

```

import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;

import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 * 2. it must not match the patterns in deniedFieldsArray
 */
public final class FieldPermissions implements Accountable {

    public static final FieldPermissions DEFAULT = new FieldPermissions();

    private static final long BASE_FIELD_PERM_DEF_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldPermissionsDefinition(null, null));
    private static final long BASE_FIELD_GROUP_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldGrantExcludeGroup(null, null));
    private static final long BASE_HASHSET_SIZE = RamUsageEstimator.shallowSizeOfInstance(HashSet.class);
    private static final long BASE_HASHSET_ENTRY_SIZE;
    static {
        HashMap<String, Object> map = new HashMap<>();
        map.put(FieldPermissions.class.getName(), new Object());
        long mapEntryShallowSize = RamUsageEstimator.shallowSizeOf(map.entrySet().iterator().next());
        // assume a load factor of 50%
        // for each entry, we need two object refs, one for the entry itself
        // and one for the free space that is due to the fact hash tables can
        // not be fully loaded
        BASE_HASHSET_ENTRY_SIZE = mapEntryShallowSize + 2 *
RamUsageEstimator.NUM_BYTES_OBJECT_REF;
    }

    private final FieldPermissionsDefinition fieldPermissionsDefinition;
    // an automaton that represents a union of one more sets of permitted and denied fields
    private final CharacterRunAutomaton permittedFieldsAutomaton;

```



```

private final boolean permittedFieldsAutomatonIsTotal;
private final Automaton originalAutomaton;

private final long ramBytesUsed;

/** Constructor that does not enable field-level security: all fields are accepted. */
public FieldPermissions() {
    this(new FieldPermissionsDefinition(null, null), Automatons.MATCH_ALL);
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
public FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
    this(fieldPermissionsDefinition, initializePermittedFieldsAutomaton(fieldPermissionsDefinition));
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition, Automaton permittedFieldsAutomaton)
{
    if (permittedFieldsAutomaton.isDeterministic() == false && permittedFieldsAutomaton.getNumStates() > 1) {
        // we only accept deterministic automata so that the CharacterRunAutomaton constructor
        // directly wraps the provided automaton
        throw new IllegalArgumentException("Only accepts deterministic automata");
    }
    this.fieldPermissionsDefinition = fieldPermissionsDefinition;
    this.originalAutomaton = permittedFieldsAutomaton;
    this.permittedFieldsAutomaton = new CharacterRunAutomaton(permittedFieldsAutomaton);
    // we cache the result of isTotal since this might be a costly operation
    this.permittedFieldsAutomatonIsTotal = Operations.isTotal(permittedFieldsAutomaton);

    long ramBytesUsed = BASE_FIELD_PERM_DEF_BYTES;

    for (FieldGrantExcludeGroup group : fieldPermissionsDefinition.getFieldGrantExcludeGroups()) {
        ramBytesUsed += BASE_FIELD_GROUP_BYTES + BASE_HASHSET_ENTRY_SIZE;
        if (group.getGrantedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getGrantedFields());
        }
        if (group.getExcludedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getExcludedFields());
        }
    }
    ramBytesUsed += permittedFieldsAutomaton.ramBytesUsed();
    ramBytesUsed += runAutomatonRamBytesUsed(permittedFieldsAutomaton);
    this.ramBytesUsed = ramBytesUsed;
}

/**

```

```

* Return an estimation of the ram bytes used by a {@link CharacterRunAutomaton}
* that wraps the given automaton.
*/
private static long runAutomatonRamBytesUsed(Automaton a) {
    return a.getNumStates() * 5; // wild guess, better than 0
}

public static Automaton initializePermittedFieldsAutomaton(FieldPermissionsDefinition
fieldPermissionsDefinition) {
    Set<FieldGrantExcludeGroup> groups = fieldPermissionsDefinition.getFieldGrantExcludeGroups();
    assert groups.size() > 0 : "there must always be a single group for field inclusion/exclusion";
    List<Automaton> automatonList =
        groups.stream()
            .map(g -> FieldPermissions.initializePermittedFieldsAutomaton(g.getGrantedFields(),
g.getExcludedFields()))
            .collect(Collectors.toList());
    return Automatons.unionAndMinimize(automatonList);
}

private static Automaton initializePermittedFieldsAutomaton(final String[] grantedFields, final String[]
deniedFields) {
    Automaton grantedFieldsAutomaton;
    if (grantedFields == null || Arrays.stream(grantedFields).anyMatch(Regex::isMatchAllPattern)) {
        grantedFieldsAutomaton = Automatons.MATCH_ALL;
    } else {
        // an automaton that includes metadata fields, including join fields created by the _parent field such
        // as _parent#type
        Automaton metaFieldsAutomaton = Operations.concatenate(Automata.makeChar('_'),
Automata.makeAnyString());
        grantedFieldsAutomaton = Operations.union(Automatons.patterns(grantedFields), metaFieldsAutomaton);
    }

    Automaton deniedFieldsAutomaton;
    if (deniedFields == null || deniedFields.length == 0) {
        deniedFieldsAutomaton = Automatons.EMPTY;
    } else {
        deniedFieldsAutomaton = Automatons.patterns(deniedFields);
    }

    grantedFieldsAutomaton = MinimizationOperations.minimize(grantedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);
    deniedFieldsAutomaton = MinimizationOperations.minimize(deniedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);

    if (subsetOf(deniedFieldsAutomaton, grantedFieldsAutomaton) == false) {
        throw new ElasticsearchSecurityException("Exceptions for field permissions must be a subset of the " +
            "granted fields but " + Strings.arrayToCommaDelimitedString(deniedFields) + " is not a subset of " +
            Strings.arrayToCommaDelimitedString(grantedFields));
    }
}

```

```

    }

    grantedFieldsAutomaton = Automaton.minusAndMinimize(grantedFieldsAutomaton,
deniedFieldsAutomaton);
    return grantedFieldsAutomaton;
}

/**
 * Returns true if this field permission policy allows access to the field and false if not.
 * fieldName can be a wildcard.
 */
public boolean grantsAccessTo(String fieldName) {
    return permittedFieldsAutomatonIsTotal || permittedFieldsAutomaton.run(fieldName);
}

FieldPermissionsDefinition getFieldPermissionsDefinition() {
    return fieldPermissionsDefinition;
}

/** Return whether field-level security is enabled, ie. whether any field might be filtered out. */
public boolean hasFieldLevelSecurity() {
    return permittedFieldsAutomatonIsTotal == false;
}

/** Return a wrapped reader that only exposes allowed fields. */
public DirectoryReader filter(DirectoryReader reader) throws IOException {
    if (hasFieldLevelSecurity() == false) {
        return reader;
    }
    return FieldSubsetReader.wrap(reader, permittedFieldsAutomaton);
}

// for testing only
Automaton getIncludeAutomaton() {
    return originalAutomaton;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    FieldPermissions that = (FieldPermissions) o;

    if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
    return fieldPermissionsDefinition != null ?
        fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
null;
}

```

```

    }

    @Override
    public int hashCode() {
        int result = fieldPermissionsDefinition != null ? fieldPermissionsDefinition.hashCode() : 0;
        result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
        return result;
    }

    @Override
    public long ramBytesUsed() {
        return ramBytesUsed;
    }
}
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;

import java.util.function.Predicate;

/**
 * A permission that is based on privileges for cluster wide actions
 */
public final class ClusterPermission {

    public static final ClusterPermission NONE = new ClusterPermission(ClusterPrivilege.NONE);

    private final ClusterPrivilege privilege;
    private final Predicate<String> predicate;

    ClusterPermission(ClusterPrivilege privilege) {
        this.privilege = privilege;
        this.predicate = privilege.predicate();
    }

    public ClusterPrivilege privilege() {
        return privilege;
    }

    public boolean check(String action) {
        return predicate.test(action);
    }
}

```

```

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import java.util.Arrays;
import java.util.Collections;
import java.util.Set;

/**
 * Represents the definition of a {@link FieldPermissions}. Field permissions are defined as a
 * collections of grant and exclude definitions where the exclude definition must be a subset of
 * the grant definition.
 */
public final class FieldPermissionsDefinition {

    private final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups;

    public FieldPermissionsDefinition(String[] grant, String[] exclude) {
        this(Collections.singleton(new FieldGrantExcludeGroup(grant, exclude)));
    }

    public FieldPermissionsDefinition(Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups) {
        this.fieldGrantExcludeGroups = Collections.unmodifiableSet(fieldGrantExcludeGroups);
    }

    public Set<FieldGrantExcludeGroup> getFieldGrantExcludeGroups() {
        return fieldGrantExcludeGroups;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;

        FieldPermissionsDefinition that = (FieldPermissionsDefinition) o;

        return fieldGrantExcludeGroups != null ?
            fieldGrantExcludeGroups.equals(that.fieldGrantExcludeGroups) :
            that.fieldGrantExcludeGroups == null;
    }

    @Override
    public int hashCode() {
        return fieldGrantExcludeGroups != null ? fieldGrantExcludeGroups.hashCode() : 0;
    }
}

```

```

public static final class FieldGrantExcludeGroup {
    private final String[] grantedFields;
    private final String[] excludedFields;

    public FieldGrantExcludeGroup(String[] grantedFields, String[] excludedFields) {
        this.grantedFields = grantedFields;
        this.excludedFields = excludedFields;
    }

    public String[] getGrantedFields() {
        return grantedFields;
    }

    public String[] getExcludedFields() {
        return excludedFields;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;

        FieldGrantExcludeGroup that = (FieldGrantExcludeGroup) o;

        if (!Arrays.equals(grantedFields, that.grantedFields)) return false;
        return Arrays.equals(excludedFields, that.excludedFields);
    }

    @Override
    public int hashCode() {
        int result = Arrays.hashCode(grantedFields);
        result = 31 * result + Arrays.hashCode(excludedFields);
        return result;
    }
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseAction extends Action<GetLicenseRequest, GetLicenseResponse,

```

```

GetLicenseRequestBuilder> {

    public static final GetLicenseAction INSTANCE = new GetLicenseAction();
    public static final String NAME = "cluster:monitor/xpack/license/get";

    private GetLicenseAction() {
        super(NAME);
    }

    @Override
    public GetLicenseResponse newResponse() {
        return new GetLicenseResponse();
    }

    @Override
    public GetLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetLicenseRequestBuilder(client, this);
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.AbstractNamedDiffable;
import org.elasticsearch.cluster.MergableCustomMetaData;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.license.License.OperationMode;

import java.io.IOException;
import java.util.EnumSet;

/**
 * Contains metadata about registered licenses
 */
public class LicensesMetaData extends AbstractNamedDiffable<MetaData.Custom> implements MetaData.Custom,
    MergableCustomMetaData<LicensesMetaData> {

    public static final String TYPE = "licenses";

```

```

/**
 * When license is explicitly removed by a user, LICENSE_TOMBSTONE
 * is used as a placeholder in the license metadata. This enables
 * us to distinguish between the scenario when a cluster never
 * had a license (null) and when a license was removed explicitly
 * (LICENSE_TOMBSTONE).
 * We rely on this to decide whether to generate a unsigned trial
 * license or not. we should only generate a license if no license
 * ever existed in the cluster state
 */
public static final License LICENSE_TOMBSTONE = License.builder()
    .type("trial")
    .issuer("elasticsearch")
    .uid("TOMBSTONE")
    .issuedTo("")
    .maxNodes(0)
    .issueDate(0)
    .expiryDate(0)
    .build();

private License license;

// This field describes the version of x-pack for which this cluster has exercised a trial. If the field
// is null, then no trial has been exercised. We keep the version to leave open the possibility that we
// may eventually allow a cluster to exercise a trial every time they upgrade to a new major version.
@Nullable
private Version trialVersion;

LicensesMetaData(License license, Version trialVersion) {
    this.license = license;
    this.trialVersion = trialVersion;
}

public License getLicense() {
    return license;
}

boolean isEligibleForTrial() {
    if (trialVersion == null) {
        return true;
    }
    return Version.CURRENT.major > trialVersion.major;
}

Version getMostRecentTrialVersion() {
    return trialVersion;
}

```



```

@Override
public String toString() {
    return "LicensesMetaData{" +
        "license=" + license +
        ", trialVersion=" + trialVersion +
        '}';
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    LicensesMetaData that = (LicensesMetaData) o;

    if (license != null ? !license.equals(that.license) : that.license != null) return false;
    return trialVersion != null ? trialVersion.equals(that.trialVersion) : that.trialVersion == null;
}

@Override
public int hashCode() {
    int result = license != null ? license.hashCode() : 0;
    result = 31 * result + (trialVersion != null ? trialVersion.hashCode() : 0);
    return result;
}

@Override
public String getWriteableName() {
    return TYPE;
}

@Override
public EnumSet<MetaData.XContentContext> context() {
    return EnumSet.of(MetaData.XContentContext.GATEWAY);
}

public static LicensesMetaData fromXContent(XContentParser parser) throws IOException {
    License license = LICENSE_TOMBSTONE;
    Version trialLicense = null;
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String fieldName = parser.currentName();
            if (fieldName != null) {
                if (fieldName.equals(Fields.LICENSE)) {
                    token = parser.nextToken();
                    if (token == XContentParser.Token.START_OBJECT) {

```

```

        license = License.fromXContent(parser);
    } else if (token == XContentParser.Token.VALUE_NULL) {
        license = LICENSE_TOMBSTONE;
    }
    } else if (fieldName.equals(Fields.TRIAL_LICENSE)) {
        parser.nextToken();
        trialLicense = Version.fromString(parser.text());
    }
    }
    }
    }
    return new LicensesMetaData(license, trialLicense);
}

```

```

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        builder.nullField(Fields.LICENSE);
    } else {
        builder.startObject(Fields.LICENSE);
        license.toInnerXContent(builder, params);
        builder.endObject();
    }
    if (trialVersion != null) {
        builder.field(Fields.TRIAL_LICENSE, trialVersion.toString());
    }
    return builder;
}

```

```

@Override
public void writeTo(StreamOutput streamOutput) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        streamOutput.writeBoolean(false); // no license
    } else {
        streamOutput.writeBoolean(true); // has a license
        license.writeTo(streamOutput);
    }
    if (streamOutput.getVersion().onOrAfter(Version.V_6_1_0)) {
        if (trialVersion == null) {
            streamOutput.writeBoolean(false);
        } else {
            streamOutput.writeBoolean(true);
            Version.writeVersion(trialVersion, streamOutput);
        }
    }
}
}

```

```

public LicensesMetaData(StreamInput streamInput) throws IOException {

```

```

if (streamInput.readBoolean()) {
    license = License.readLicense(streamInput);
} else {
    license = LICENSE_TOMBSTONE;
}
if (streamInput.getVersion().onOrAfter(Version.V_6_1_0)) {
    boolean hasExercisedTrial = streamInput.readBoolean();
    if (hasExercisedTrial) {
        this.trialVersion = Version.readVersion(streamInput);
    }
}
}

public static NamedDiff<MetaData.Custom> readDiffFrom(StreamInput streamInput) throws IOException {
    return readDiffFrom(MetaData.Custom.class, TYPE, streamInput);
}

public static License extractLicense(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        License license = licensesMetaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return null;
        } else {
            return license;
        }
    }
    return null;
}

@Override
public LicensesMetaData merge(LicensesMetaData other) {
    if (other.license == null) {
        return this;
    } else if (license == null
        || OperationMode.compare(other.license.operationMode(), license.operationMode()) > 0) {
        return other;
    }
    return this;
}

private static final class Fields {
    private static final String LICENSE = "license";
    private static final String TRIAL_LICENSE = "trial_license";
}
}
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```

```

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*/
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestController.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(DELETE, URI_BASE + "/license", this);
    }

    @Override
    public String getName() {
        return "xpack_delete_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        DeleteLicenseRequest deleteLicenseRequest = new DeleteLicenseRequest();
        deleteLicenseRequest.timeout(request.paramAsTime("timeout", deleteLicenseRequest.timeout()));
        deleteLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
        deleteLicenseRequest.masterNodeTimeout()));

        return channel -> client.es().admin().cluster().execute(DeleteLicenseAction.INSTANCE, deleteLicenseRequest,
        new RestToXContentListener<>(channel));
    }
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

```

```

public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
PutLicenseRequestBuilder> {

    public static final PutLicenseAction INSTANCE = new PutLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/put";

    private PutLicenseAction() {
        super(NAME);
    }

    @Override
    public PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    public PutLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PutLicenseRequestBuilder(client, this);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetBasicStatusRequest extends MasterNodeReadRequest<GetBasicStatusRequest> {

    public GetBasicStatusRequest() {
    }

    public GetBasicStatusRequest(StreamInput in) throws IOException {
        super(in);
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetTrialStatusAction extends Action<GetTrialStatusRequest, GetTrialStatusResponse,
GetTrialStatusRequestBuilder> {

    public static final GetTrialStatusAction INSTANCE = new GetTrialStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/trial_status";

    private GetTrialStatusAction() {
        super(NAME);
    }

    @Override
    public GetTrialStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetTrialStatusRequestBuilder(client, this);
    }

    @Override
    public GetTrialStatusResponse newResponse() {
        return new GetTrialStatusResponse();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;

```

```

import org.elasticsearch.transport.TransportService;

public class TransportGetBasicStatusAction extends TransportMasterNodeReadAction<GetBasicStatusRequest,
GetBasicStatusResponse> {

    @Inject
    public TransportGetBasicStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,

        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetBasicStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
            GetBasicStatusRequest::new, indexNameExpressionResolver);
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected GetBasicStatusResponse newResponse() {
        return new GetBasicStatusResponse();
    }

    @Override
    protected void masterOperation(GetBasicStatusRequest request, ClusterState state,
        ActionListener<GetBasicStatusResponse> listener) throws Exception {
        LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
        if (licensesMetaData == null) {
            listener.onResponse(new GetBasicStatusResponse(true));
        } else {
            License license = licensesMetaData.getLicense();
            listener.onResponse(new GetBasicStatusResponse(license == null || license.type().equals("basic") == false));
        }
    }

    @Override
    protected ClusterBlockException checkBlock(GetBasicStatusRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
    }
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartBasicAction extends TransportMasterNodeAction<PostStartBasicRequest,
PostStartBasicResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartBasicAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartBasicAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, PostStartBasicRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }

    @Override
    protected void masterOperation(PostStartBasicRequest request, ClusterState state,
                                   ActionListener<PostStartBasicResponse> listener) throws Exception {
        licenseService.startBasicLicense(request, listener);
    }

    @Override
    protected ClusterBlockException checkBlock(PostStartBasicRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }
}

```



```

    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetTrialStatus extends XPackRestHandler {

    RestGetTrialStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/trial_status", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        return channel -> client.licensing().prepareGetStartTrial().execute(
            new RestBuilderListener<GetTrialStatusResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetTrialStatusResponse response, XContentBuilder builder) throws
                Exception {
                    builder.startObject();
                    builder.field("eligible_to_start_trial", response.isEligibleToStartTrial());
                    builder.endObject();
                    return new BytesRestResponse(RestStatus.OK, builder);
                }
            });
    }

    @Override

```

```

    public String getName() {
        return "xpack_trial_status_action";
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseAction extends Action<DeleteLicenseRequest, DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

    public static final DeleteLicenseAction INSTANCE = new DeleteLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/delete";

    private DeleteLicenseAction() {
        super(NAME);
    }

    @Override
    public DeleteLicenseResponse newResponse() {
        return new DeleteLicenseResponse();
    }

    @Override
    public DeleteLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new DeleteLicenseRequestBuilder(client, this);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetTrialStatusRequest extends MasterNodeReadRequest<GetTrialStatusRequest> {

```

```

public GetTrialStatusRequest() {
}

public GetTrialStatusRequest(StreamInput in) throws IOException {
    super(in);
}

@Override
public ActionRequestValidationException validate() {
    return null;
}
}
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 */
package org.elasticsearch.license;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.core.internal.io.Streams;

import java.io.ByteArrayOutputStream;
import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Arrays;
import java.util.Base64;
import java.util.Collections;

/**
 * Responsible for verifying signed licenses
 */
public class LicenseVerifier {

    /**
     * verifies the license content with the signature using the packaged

```

```

* public key
* @param license to verify
* @return true if valid, false otherwise
*/
public static boolean verifyLicense(final License license, byte[] publicKeyData) {
    byte[] signedContent = null;
    byte[] publicKeyFingerprint = null;
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        int version = byteBuffer.getInt();
        int magicLen = byteBuffer.getInt();
        byte[] magic = new byte[magicLen];
        byteBuffer.get(magic);
        int hashLen = byteBuffer.getInt();
        publicKeyFingerprint = new byte[hashLen];
        byteBuffer.get(publicKeyFingerprint);
        int signedContentLen = byteBuffer.getInt();
        signedContent = new byte[signedContentLen];
        byteBuffer.get(signedContent);
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        Signature rsa = Signature.getInstance("SHA512withRSA");
        rsa.initVerify(CryptUtils.readPublicKey(publicKeyData));
        BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
        BytesRef ref;
        while((ref = iterator.next()) != null) {
            rsa.update(ref.bytes, ref.offset, ref.length);
        }
        return rsa.verify(signedContent);
    } catch (IOException | NoSuchAlgorithmException | SignatureException | InvalidKeyException e) {
        throw new IllegalStateException(e);
    } finally {
        if (signedContent != null) {
            Arrays.fill(signedContent, (byte) 0);
        }
    }
}

public static boolean verifyLicense(final License license) {
    final byte[] publicKeyBytes;
    try (InputStream is = LicenseVerifier.class.getResourceAsStream("/public.key")) {
        ByteArrayOutputStream out = new ByteArrayOutputStream();
        Streams.copy(is, out);
        publicKeyBytes = out.toByteArray();
    } catch (IOException ex) {
        throw new IllegalStateException(ex);
    }
}

```

```

    }
    return verifyLicense(license, publicKeyBytes);
}
}
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicReference;

public class StartBasicClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
    To acknowledge the license, " +
        "please read the following messages and call /start_basic again, this time with the \"acknowledge=true\"
    parameter:";

    private final Logger logger;
    private final String clusterName;
    private final PostStartBasicRequest request;
    private final ActionListener<PostStartBasicResponse> listener;
    private final Clock clock;
    private AtomicReference<Map<String, String[]>> ackMessages = new
    AtomicReference<>(Collections.emptyMap());

    StartBasicClusterTask(Logger logger, String clusterName, Clock clock, PostStartBasicRequest request,
        ActionListener<PostStartBasicResponse> listener) {
        this.logger = logger;
        this.clusterName = clusterName;
        this.request = request;
        this.listener = listener;
    }

```

```

    this.clock = clock;
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
    logger.debug("license prior to starting basic license: {}", oldLicensesMetaData);
    License oldLicense = LicensesMetaData.extractLicense(oldLicensesMetaData);
    Map<String, String[]> acknowledgeMessages = ackMessages.get();
    if (acknowledgeMessages.isEmpty() == false) {
        listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT, acknowledgeMessages,
        ACKNOWLEDGEMENT_HEADER));
    } else if (oldLicense != null && oldLicense.type().equals("basic")) {
        listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.ALREADY_USING_BASIC));
    } else {
        listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.GENERATED_BASIC));
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData licensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
    License currentLicense = LicensesMetaData.extractLicense(licensesMetaData);
    if (currentLicense == null || currentLicense.type().equals("basic") == false) {
        long issueDate = clock.millis();
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type("basic")
            .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        if (request.isAcknowledged() == false && currentLicense != null) {
            Map<String, String[]> ackMessages = LicenseService.getAckMessages(selfGeneratedLicense,
currentLicense);
            if (ackMessages.isEmpty() == false) {
                this.ackMessages.set(ackMessages);
                return currentState;
            }
        }
        Version trialVersion = null;
        if (licensesMetaData != null) {
            trialVersion = licensesMetaData.getMostRecentTrialVersion();

```

```

    }
    LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense, trialVersion);
    mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
} else {
    return currentState;
}
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{}]", source), e);
    listener.onFailure(e);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.monitoring.MonitoringField;

import java.util.Collections;
import java.util.LinkedHashMap;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.concurrent.CopyOnWriteArrayList;
import java.util.function.BiFunction;

/**
 * A holder for the current state of the license for all xpack features.
 */
public class XPackLicenseState {

    /** Messages for each feature which are printed when the license expires. */
    static final Map<String, String[]> EXPIRATION_MESSAGES;
    static {
        Map<String, String[]> messages = new LinkedHashMap<>();
        messages.put(XPackField.SECURITY, new String[] {

```

```

    "Cluster health, cluster stats and indices stats operations are blocked",
    "All data operations (read and write) continue to work"
  });
  messages.put(XPackField.WATCHER, new String[] {
    "PUT / GET watch APIs are disabled, DELETE watch API continues to work",
    "Watches execute and write to the history",
    "The actions of the watches don't execute"
  });
  messages.put(XPackField.MONITORING, new String[] {
    "The agent will stop collecting cluster and indices metrics",
    "The agent will stop automatically cleaning indices older than [xpack.monitoring.history.duration]"
  });
  messages.put(XPackField.GRAPH, new String[] {
    "Graph explore APIs are disabled"
  });
  messages.put(XPackField.MACHINE_LEARNING, new String[] {
    "Machine learning APIs are disabled"
  });
  messages.put(XPackField.LOGSTASH, new String[] {
    "Logstash will continue to poll centrally-managed pipelines"
  });
  messages.put(XPackField.DEPRECATATION, new String[] {
    "Deprecation APIs are disabled"
  });
  messages.put(XPackField.UPGRADE, new String[] {
    "Upgrade API is disabled"
  });
  messages.put(XPackField.SQL, new String[] {
    "SQL support is disabled"
  });
  messages.put(XPackField.ROLLUP, new String[] {
    "Creating and Starting rollup jobs will no longer be allowed.",
    "Stopping/Deleting existing jobs, RollupCaps API and RollupSearch continue to function."
  });
  EXPIRATION_MESSAGES = Collections.unmodifiableMap(messages);
}

/**
 * Messages for each feature which are printed when the license type changes.
 * The value is a function taking the old and new license type, and returns the messages for that feature.
 */
static final Map<String, BiFunction<OperationMode, OperationMode, String[]>>
ACKNOWLEDGMENT_MESSAGES;
static {
  Map<String, BiFunction<OperationMode, OperationMode, String[]>> messages = new LinkedHashMap<>();
  messages.put(XPackField.SECURITY, XPackLicenseState::securityAcknowledgementMessages);
  messages.put(XPackField.WATCHER, XPackLicenseState::watcherAcknowledgementMessages);
  messages.put(XPackField.MONITORING, XPackLicenseState::monitoringAcknowledgementMessages);
}

```



```

    messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
    messages.put(XPackField.MACHINE_LEARNING,
XPackLicenseState::machineLearningAcknowledgementMessages);
    messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgementMessages);
    messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
    ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}

private static String[] securityAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        "The following X-Pack security functionality will be disabled: authentication, authorization, " +
                            "ip filtering, and auditing. Please restart your node after applying the license.",
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
            break;
        case GOLD:
            switch (currentMode) {
                case BASIC:
                case STANDARD:
                    // ^^ though technically it was already disabled, it's not bad to remind them
                case TRIAL:
                case PLATINUM:
                    return new String[] {
                        "Field and document level access control will be disabled.",
                        "Custom realms will be ignored."
                    };
            }
            break;
        case STANDARD:
            switch (currentMode) {
                case BASIC:
                    // ^^ though technically it was already disabled, it's not bad to remind them
                case GOLD:
                case PLATINUM:
                case TRIAL:
                    return new String[] {
                        "Authentication will be limited to the native realms.",
                        "IP filtering and auditing will be disabled.",
                    };
            }
    }
}

```

```

        "Field and document level access control will be disabled.",
        "Custom realms will be ignored."
    };
    }
}
return Strings.EMPTY_ARRAY;
}

private static String[] watcherAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] { "Watcher will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] monitoringAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        LoggerMessageFormat.format(
                            "Multi-cluster support is disabled for clusters with [{}] license. If you are\n" +
                            "running multiple clusters, users won't be able to access the clusters with\n" +
                            "[{}] licenses from within a single X-Pack Kibana instance. You will have to deploy a\n" +
                            "separate and dedicated X-pack Kibana instance for each [{}] cluster you wish to monitor.",
                            newMode, newMode, newMode),
                        LoggerMessageFormat.format(
                            "Automatic index cleanup is locked to {} days for clusters with [{}] license.",
                            MonitoringField.HISTORY_DURATION.getDefault(Settings.EMPTY).days(), newMode)
                    };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

```

```

}

private static String[] graphAcknowledgementMessages(OperationMode currentMode, OperationMode newMode)
{
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Graph will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

```

```

private static String[] machineLearningAcknowledgementMessages(OperationMode currentMode,
OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Machine learning will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

```

```

private static String[] logstashAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] { "Logstash will no longer poll for centrally-managed pipelines" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

```

```

}

private static String[] sqlAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "JDBC support will be disabled, but you can continue to use SQL CLI and
REST endpoint" };
            }
            break;
        }
        return Strings.EMPTY_ARRAY;
    }
}

/** A wrapper for the license mode and state, to allow atomically swapping. */
private static class Status {

    /** The current "mode" of the license (ie license type). */
    final OperationMode mode;

    /** True if the license is active, or false if it is expired. */
    final boolean active;

    Status(OperationMode mode, boolean active) {
        this.mode = mode;
        this.active = active;
    }
}

private volatile Status status = new Status(OperationMode.TRIAL, true);
private final List<Runnable> listeners = new CopyOnWriteArrayList<>();
private final boolean isSecurityEnabled;
private final boolean isSecurityExplicitlyEnabled;

public XPackLicenseState(Settings settings) {
    this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
    this.isSecurityExplicitlyEnabled = settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) &&
isSecurityEnabled;
}

/** Updates the current state of the license, which will change what features are available. */
void update(OperationMode mode, boolean active) {
    status = new Status(mode, active);
    listeners.forEach(Runnable::run);
}

```

```

}

/** Add a listener to be notified on license change */
public void addListener(Runnable runnable) {
    listeners.add(Objects.requireNonNull(runnable));
}

/** Remove a listener */
public void removeListener(Runnable runnable) {
    listeners.remove(runnable);
}

/** Return the current license type. */
public OperationMode getOperationMode() {
    return status.mode;
}

/** Return true if the license is currently within its time boundaries, false otherwise. */
public boolean isActive() {
    return status.active;
}

/**
 * @return true if authentication and authorization should be enabled. this does not indicate what realms are
 * available
 * @see #allowedRealmType() for the enabled realms
 */
public boolean isAuthAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.STANDARD || mode == OperationMode.GOLD || mode ==
OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * @return true if IP filtering should be enabled
 */
public boolean isIpFilteringAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * @return true if auditing should be enabled
 */
public boolean isAuditingAllowed() {
    OperationMode mode = status.mode;

```

```

    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * Indicates whether the stats and health API calls should be allowed. If a license is expired and past the grace
 * period then we deny these calls.
 *
 * @return true if the license allows for the stats and health APIs to be used.
 */
public boolean isStatsAndHealthAllowed() {
    return status.active;
}

/**
 * Determine if Document Level Security (DLS) and Field Level Security (FLS) should be enabled.
 *
 * <p>
 * DLS and FLS are only disabled when the mode is not:
 *
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 *
 * Note: This does not consider the <em>state</em> of the license so that Security does not suddenly leak
information!
 *
 * @return {@code true} to enable DLS and FLS. Otherwise {@code false}.
 */
public boolean isDocumentAndFieldLevelSecurityAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL || mode == OperationMode.PLATINUM;
}

/** Classes of realms that may be available based on the license type. */
public enum AllowedRealmType {
    NONE,
    NATIVE,
    DEFAULT,
    ALL
}

/**
 * @return the type of realms that are enabled based on the license {@link OperationMode}
 */
public AllowedRealmType allowedRealmType() {
    switch (status.mode) {
        case PLATINUM:
        case TRIAL:
            return AllowedRealmType.ALL;
    }
}

```

```

    case GOLD:
        return AllowedRealmType.DEFAULT;
    case STANDARD:
        return AllowedRealmType.NATIVE;
    default:
        return AllowedRealmType.NONE;
    }
}

/**
 * @return whether custom role providers are allowed based on the license { @link OperationMode }
 */
public boolean isCustomRoleProvidersAllowed() {
    final Status localStatus = status;
    return (localStatus.mode == OperationMode.PLATINUM || localStatus.mode == OperationMode.TRIAL )
        && localStatus.active;
}

/**
 * Determine if Watcher is available based on the current license.
 * <p>
 * Watcher is available if the license is active (hasn't expired) and of one of the following types:
 * <ul>
 * <li>{ @link OperationMode#STANDARD}</li>
 * <li>{ @link OperationMode#PLATINUM}</li>
 * <li>{ @link OperationMode#GOLD}</li>
 * <li>{ @link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return { @code true } as long as the license is valid. Otherwise { @code false }.
 */
public boolean isWatcherAllowed() {
    // status is volatile, so a local variable is used for a consistent view
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:
        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

```

```

}

/**
 * Monitoring is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isMonitoringAllowed() {
    return status.active;
}

/**
 * Monitoring Cluster Alerts requires the equivalent license to use Watcher.
 *
 * @return {@link #isWatcherAllowed()}
 * @see #isWatcherAllowed()
 */
public boolean isMonitoringClusterAlertsAllowed() {
    return isWatcherAllowed();
}

/**
 * Determine if the current license allows the retention of indices to be modified.
 * <p>
 * Only users with a non-{@link OperationMode#BASIC} license can update the retention period.
 * <p>
 * Note: This does not consider the <em>state</em> of the license so that any change is remembered for when
they fix their license.
 *
 * @return {@code true} if the user is allowed to modify the retention. Otherwise {@code false}.
 */
public boolean isUpdateRetentionAllowed() {
    final OperationMode mode = status.mode;
    return mode != OperationMode.BASIC && mode != OperationMode.MISSING;
}

/**
 * Determine if Graph Exploration should be enabled.
 * <p>
 * Exploration is only disabled when the license has expired or if the mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return {@code true} as long as the license is valid. Otherwise {@code false}.
 */
public boolean isGraphAllowed() {

```



```

    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
 * Determine if Machine Learning should be enabled.
 * <p>
 * Machine Learning is only disabled when the license has expired or if the
 * mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return {@code true} as long as the license is valid. Otherwise
 *         {@code false}.
 */
public boolean isMachineLearningAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
 * Rollup is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isRollupAllowed() {
    return status.active;
}

/**
 * Logstash is allowed as long as there is an active license of type TRIAL, STANDARD, GOLD or PLATINUM
 * @return {@code true} as long as there is a valid license
 */
public boolean isLogstashAllowed() {

```

```

Status localStatus = status;

if (localStatus.active == false) {
    return false;
}

switch (localStatus.mode) {
    case TRIAL:
    case GOLD:
    case PLATINUM:
    case STANDARD:
        return true;
    default:
        return false;
}
}

/**
 * Deprecation APIs are always allowed as long as there is an active license
 * @return {@code true} as long as there is a valid license
 */
public boolean isDeprecationAllowed() {
    return status.active;
}

/**
 * Determine if Upgrade API should be enabled.
 * <p>
 * Upgrade API is not available in for all license types except {@link OperationMode#MISSING}
 *
 * @return {@code true} as long as the license is valid. Otherwise
 *         {@code false}.
 */
public boolean isUpgradeAllowed() {
    // status is volatile
    Status localStatus = status;
    // Should work on all active licenses
    return localStatus.active;
}

/**
 * Determine if SQL support should be enabled.
 * <p>
 * SQL is available for all license types except {@link OperationMode#MISSING}
 */
public boolean isSqlAllowed() {
    return status.active;
}

```

```

/**
 * Determine if JDBC support should be enabled.
 * <p>
 * JDBC is available only in for {@link OperationMode#PLATINUM} and {@link OperationMode#TRIAL}
licences
 */
public boolean isJdbcAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

public boolean isTrialLicense() {
    return status.mode == OperationMode.TRIAL;
}

public boolean isSecurityAvailable() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM || mode ==
OperationMode.STANDARD ||
        mode == OperationMode.TRIAL;
}

public boolean isSecurityEnabled() {
    final OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL ? isSecurityExplicitlyEnabled : isSecurityEnabled;
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseResponse extends AcknowledgedResponse {

```

```

DeleteLicenseResponse() {
}

DeleteLicenseResponse(boolean acknowledged) {
    super(acknowledged);
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

public class PutLicenseResponse extends AcknowledgedResponse {

    private LicensesStatus status;
    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeHeader;

    PutLicenseResponse() {
}

```

```

public PutLicenseResponse(boolean acknowledged, LicensesStatus status) {
    this(acknowledged, status, null, Collections.<String, String[]>emptyMap());
}

public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String acknowledgeHeader,
    Map<String, String[]> acknowledgeMessages) {
    super(acknowledged);
    this.status = status;
    this.acknowledgeHeader = acknowledgeHeader;
    this.acknowledgeMessages = acknowledgeMessages;
}

public LicensesStatus status() {
    return status;
}

public Map<String, String[]> acknowledgeMessages() {
    return acknowledgeMessages;
}

public String acknowledgeHeader() {
    return acknowledgeHeader;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
    status = LicensesStatus.fromId(in.readVInt());
    acknowledgeHeader = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
}

```

```

out.writeVInt(status.id());
out.writeOptionalString(acknowledgeHeader);
out.writeVInt(acknowledgeMessages.size());
for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
    out.writeString(entry.getKey());
    out.writeVInt(entry.getValue().length);
    for (String message : entry.getValue()) {
        out.writeString(message);
    }
}
}
}

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    switch (status) {
        case VALID:
            builder.field("license_status", "valid");
            break;
        case INVALID:
            builder.field("license_status", "invalid");
            break;
        case EXPIRED:
            builder.field("license_status", "expired");
            break;
        default:
            throw new IllegalArgumentException("unknown status [" + status + "] found");
    }
    if (!acknowledgeMessages.isEmpty()) {
        builder.startObject("acknowledge");
        builder.field("message", acknowledgeHeader);
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            builder.startArray(entry.getKey());
            for (String message : entry.getValue()) {
                builder.value(message);
            }
            builder.endArray();
        }
        builder.endObject();
    }
}

@Override
public String toString() {
    return Strings.toString(this, true, true);
}
}
/*
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```

```

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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
    PostStartTrialResponse, PostStartTrialRequestBuilder> {

    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
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* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportDeleteLicenseAction extends TransportMasterNodeAction<DeleteLicenseRequest,
    DeleteLicenseResponse> {

    private final LicenseService licenseService;

    @Inject

```

```

public TransportDeleteLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, DeleteLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
        indexNameExpressionResolver, DeleteLicenseRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.MANAGEMENT;
}

@Override
protected DeleteLicenseResponse newResponse() {
    return new DeleteLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(DeleteLicenseRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final DeleteLicenseRequest request, ClusterState state, final
ActionListener<DeleteLicenseResponse>
    listener) throws ElasticsearchException {
    licenseService.removeLicense(request, new ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            listener.onResponse(new DeleteLicenseResponse(clusterStateUpdateResponse.isAcknowledged()));
        }
    });
}

@Override
public void onFailure(Exception e) {
    listener.onFailure(e);
}
});
}
}
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 */
package org.elasticsearch.license;

```



```

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.apache.lucene.util.BytesRef;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.watcher.FileChangesListener;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.concurrent.atomic.AtomicBoolean;

/**
 * File based watcher for license { @link OperationMode }
 * Watches for changes in <code>licenseModePath</code>, use
 * { @link #getCurrentOperationMode() } to access the latest mode
 *
 * In case of failure to read a valid operation mode from <code>licenseModePath</code>,
 * the operation mode will default to PLATINUM
 */
public final class OperationModeFileWatcher implements FileChangesListener {
    private final ResourceWatcherService resourceWatcherService;
    private final Path licenseModePath;
    private final AtomicBoolean initialized = new AtomicBoolean();
    private final OperationMode defaultOperationMode = OperationMode.PLATINUM;
    private volatile OperationMode currentOperationMode = defaultOperationMode;
    private final Logger logger;
    private final Runnable onChange;

    public OperationModeFileWatcher(ResourceWatcherService resourceWatcherService, Path licenseModePath,
        Logger logger, Runnable onChange) {
        this.resourceWatcherService = resourceWatcherService;
        this.licenseModePath = licenseModePath;
        this.logger = logger;
        this.onChange = onChange;
    }

    public void init() {
        if (initialized.compareAndSet(false, true)) {
            final FileWatcher watcher = new FileWatcher(licenseModePath);
            watcher.addListener(this);
            try {
                resourceWatcherService.add(watcher, ResourceWatcherService.Frequency.HIGH);
            }
        }
    }
}

```

```

        if (Files.exists(licenseModePath)) {
            onChange(licenseModePath);
        }
    } catch (IOException e) {
        logger.error("couldn't initialize watching license mode file", e);
    }
}

/**
 * Returns the current operation mode based on license mode file.
 * Defaults to {@link OperationMode#PLATINUM}
 */
public OperationMode getCurrentOperationMode() {
    return currentOperationMode;
}

@Override
public void onFileInit(Path file) {
    onChange(file);
}

@Override
public void onFileCreated(Path file) {
    onChange(file);
}

@Override
public void onFileDeleted(Path file) {
    onChange(file);
}

@Override
public void onFileChanged(Path file) {
    onChange(file);
}

private synchronized void onChange(Path file) {
    if (file.equals(licenseModePath)) {
        OperationMode newOperationMode = defaultOperationMode;
        try {
            if (Files.exists(licenseModePath)
                && Files.isReadable(licenseModePath)) {
                final byte[] content;
                try {
                    content = Files.readAllBytes(licenseModePath);
                } catch (IOException e) {
                    logger.error(

```

```

        (Supplier<?>) () -> new ParameterizedMessage(
            "couldn't read operation mode from [{}]", licenseModePath.toAbsolutePath(), e);
    return;
}
// this UTF-8 conversion is much pickier than java String
final String operationMode = new BytesRef(content).utf8ToString();
try {
    newOperationMode = OperationMode.resolve(operationMode);
} catch (IllegalArgumentException e) {
    logger.error(
        (Supplier<?>) () -> new ParameterizedMessage(
            "invalid operation mode in [{}]", licenseModePath.toAbsolutePath(), e);
    return;
}
}
} finally {
    // set this after the fact to prevent that we are jumping back and forth first setting to defaultl and then
reading the
    // actual op mode resetting it.
    this.currentOperationMode = newOperationMode;
}
onChange.run();
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetTrialStatusRequestBuilder extends ActionRequestBuilder<GetTrialStatusRequest,
    GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

    GetTrialStatusRequestBuilder(ElasticsearchClient client, GetTrialStatusAction action) {
        super(client, action, new GetTrialStatusRequest());
    }
}
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.ValidateActions;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;

public class PutLicenseRequest extends AcknowledgedRequest<PutLicenseRequest> {

    private License license;
    private boolean acknowledge = false;

    public PutLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return (license == null) ? ValidateActions.addValidationError("license is missing", null) : null;
    }

    /**
     * Parses license from json format to an instance of { @link License}
     *
     * @param licenseDefinition licenses definition
     * @param xContentType the content type of the license
     */
    public PutLicenseRequest license(BytesReference licenseDefinition, XContentType xContentType) {
        try {
            return license(License.fromSource(licenseDefinition, xContentType));
        } catch (IOException e) {
            throw new IllegalArgumentException("failed to parse license source", e);
        }
    }

    public PutLicenseRequest license(License license) {
        this.license = license;
        return this;
    }

    public License license() {
        return license;
    }
}

```

```

public PutLicenseRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean acknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    license = License.readLicense(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    license.writeTo(out);
    out.writeBoolean(acknowledge);
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;

import static org.elasticsearch.license.CryptUtils.encryptV3Format;
import static org.elasticsearch.license.CryptUtils.encrypt;
import static org.elasticsearch.license.CryptUtils.decryptV3Format;
import static org.elasticsearch.license.CryptUtils.decrypt;

```

```

class SelfGeneratedLicense {

    public static License create(License.Builder specBuilder) {
        return create(specBuilder, License.VERSION_CURRENT);
    }

    public static License create(License.Builder specBuilder, int version) {
        License spec = specBuilder
            .issuer("elasticsearch")
            .version(version)
            .build();
        final String signature;
        try {
            XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
            spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
            byte[] encrypt;
            if (version < License.VERSION_CRYPTO_ALGORITHMS) {
                encrypt = encryptV3Format(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
            } else {
                encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
            }
            byte[] bytes = new byte[4 + 4 + encrypt.length];
            ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
            // Set -version in signature
            byteBuffer.putInt(-version)
                .putInt(encrypt.length)
                .put(encrypt);
            signature = Base64.getEncoder().encodeToString(bytes);
        } catch (IOException e) {
            throw new IllegalStateException(e);
        }
        return License.builder().fromLicenseSpec(spec, signature).build();
    }

    public static boolean verify(final License license) {
        try {
            byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
            ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
            int version = byteBuffer.getInt();
            int contentLen = byteBuffer.getInt();
            byte[] content = new byte[contentLen];
            byteBuffer.get(content);
            final License expectedLicense;
            // Version in signature is -version, so check for -(-version) < 4
            byte[] decryptedContent = (-version < License.VERSION_CRYPTO_ALGORITHMS) ?
decryptV3Format(content) : decrypt(content);

```

```

// EMPTY is safe here because we don't call namedObject
try (XContentParser parser = XContentFactory.xContent(XContentType.JSON)
    .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE,
decryptedContent)) {
    parser.nextToken();
    expectedLicense = License.builder().fromLicenseSpec(License.fromXContent(parser),
        license.signature().version(-version).build());
    }
    return license.equals(expectedLicense);
} catch (IOException e) {
    throw new IllegalStateException(e);
}
}

```

```

public static boolean validSelfGeneratedType(String type) {
    return "basic".equals(type) || "trial".equals(type);
}
}

```

```

/*

```

```

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*/

```

```

*/

```

```

package org.elasticsearch.license;

```

```

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

```

```

import java.io.IOException;

```

```

import java.util.Map;

```

```

import static org.elasticsearch.rest.RestRequest.Method.POST;

```

```

public class RestPostStartTrialLicense extends XPackRestHandler {

```

```

    RestPostStartTrialLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_trial", this);
    }
}

```

```

@Override

```

```

protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
{
    PostStartTrialRequest startTrialRequest = new PostStartTrialRequest();
    startTrialRequest.setType(request.param("type", "trial"));
    startTrialRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
    return channel -> client.licensing().postStartTrial(startTrialRequest,
        new RestBuilderListener<PostStartTrialResponse>(channel) {
            @Override
            public RestResponse buildResponse(PostStartTrialResponse response, XContentBuilder builder) throws
Exception {
                PostStartTrialResponse.Status status = response.getStatus();
                builder.startObject();
                builder.field("acknowledged", startTrialRequest.isAcknowledged());
                if (status.isTrialStarted()) {
                    builder.field("trial_was_started", true);
                    builder.field("type", startTrialRequest.getType());
                } else {
                    builder.field("trial_was_started", false);
                    builder.field("error_message", status.getErrorMessage());
                }

                Map<String, String[]> acknowledgementMessages = response.getAcknowledgementMessages();
                if (acknowledgementMessages.isEmpty() == false) {
                    builder.startObject("acknowledge");
                    builder.field("message", response.getAcknowledgementMessage());
                    for (Map.Entry<String, String[]> entry : acknowledgementMessages.entrySet()) {
                        builder.startArray(entry.getKey());
                        for (String message : entry.getValue()) {
                            builder.value(message);
                        }
                        builder.endArray();
                    }
                    builder.endObject();
                }
                builder.endObject();
                return new BytesRestResponse(status.getRestStatus(), builder);
            }
        });
}

@Override
public String getName() {
    return "xpack_upgrade_to_trial_action";
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;

```



```

* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetLicenseAction extends TransportMasterNodeReadAction<GetLicenseRequest,
GetLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportGetLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                   LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                   IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
              GetLicenseRequest::new, indexNameExpressionResolver);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected GetLicenseResponse newResponse() {
        return new GetLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(GetLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
    }
}

```

```

@Override
protected void masterOperation(final GetLicenseRequest request, ClusterState state,
    final ActionListener<GetLicenseResponse> listener) throws ElasticsearchException {
    listener.onResponse(new GetLicenseResponse(licenseService.getLicense()));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartBasicLicense extends XPackRestHandler {

    RestPostStartBasicLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_basic", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        PostStartBasicRequest startBasicRequest = new PostStartBasicRequest();
        startBasicRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        startBasicRequest.timeout(request.paramAsTime("timeout", startBasicRequest.timeout()));
        startBasicRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
startBasicRequest.masterNodeTimeout()));
        return channel -> client.licensing().postStartBasic(startBasicRequest, new
RestBuilderListener<PostStartBasicResponse>(channel) {
            @Override
            public RestResponse buildResponse(PostStartBasicResponse response, XContentBuilder builder) throws
Exception {

```

```

        PostStartBasicResponse.Status status = response.getStatus();
        response.toXContent(builder, ToXContent.EMPTY_PARAMS);
        return new BytesRestResponse(status.getRestStatus(), builder);
    }
});
}

@Override
public String getName() {
    return "xpack_start_basic_action";
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.util.ArrayList;
import java.util.Base64;
import java.util.Comparator;
import java.util.List;
import java.util.Locale;

import org.apache.lucene.util.CollectionUtil;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Data structure for license. Use {@link Builder} to build a license.
 * Provides serialization/deserialization & validation methods for license object
 */

```

```

public class License implements ToXContentObject {
    public static final int VERSION_START = 1;
    public static final int VERSION_NO_FEATURE_TYPE = 2;
    public static final int VERSION_START_DATE = 3;
    public static final int VERSION_CRYPTO_ALGORITHMS = 4;
    public static final int VERSION_CURRENT = VERSION_CRYPTO_ALGORITHMS;

    /**
     * XContent param name to deserialize license(s) with
     * an additional <code>status</code> field, indicating whether a
     * particular license is 'active' or 'expired' and no signature
     * and in a human readable format
     */
    public static final String REST_VIEW_MODE = "rest_view";
    /**
     * XContent param name to deserialize license(s) with
     * no signature
     */
    public static final String LICENSE_SPEC_VIEW_MODE = "license_spec_view";
    /**
     * XContent param name to deserialize licenses according
     * to a specific license version
     */
    public static final String LICENSE_VERSION_MODE = "license_version";

    public static final Comparator<License> LATEST_ISSUE_DATE_FIRST =
    Comparator.comparing(License::issueDate).reversed();

    private final int version;
    private final String uid;
    private final String issuer;
    private final String issuedTo;
    private final long issueDate;
    private final String type;
    private final String subscriptionType;
    private final String feature;
    private final String signature;
    private final long expiryDate;
    private final long startDate;
    private final int maxNodes;
    private final OperationMode operationMode;

    /**
     * Decouples operation mode of a license from the license type value.
     * <p>
     * Note: The mode indicates features that should be made available, but it does not indicate whether the license is
     active!
     */

```

```

* The id byte is used for ordering operation modes
*/
public enum OperationMode {
    MISSING((byte) 0),
    TRIAL((byte) 1),
    BASIC((byte) 2),
    STANDARD((byte) 3),
    GOLD((byte) 4),
    PLATINUM((byte) 5);

    private final byte id;

    OperationMode(byte id) {
        this.id = id;
    }

    /** Returns non-zero positive number when <code>opMode1</code> is greater than <code>opMode2</code>
    */
    public static int compare(OperationMode opMode1, OperationMode opMode2) {
        return Integer.compare(opMode1.id, opMode2.id);
    }

    public static OperationMode resolve(String type) {
        switch (type.toLowerCase(Locale.ROOT)) {
            case "missing":
                return MISSING;
            case "trial":
            case "none": // bwc for 1.x subscription_type field
            case "dev": // bwc for 1.x subscription_type field
            case "development": // bwc for 1.x subscription_type field
                return TRIAL;
            case "basic":
                return BASIC;
            case "standard":
                return STANDARD;
            case "silver":
            case "gold":
                return GOLD;
            case "platinum":
            case "cloud_internal":
            case "internal": // bwc for 1.x subscription_type field
                return PLATINUM;
            default:
                throw new IllegalArgumentException("unknown type [" + type + "]");
        }
    }
}

```

```

private License(int version, String uid, String issuer, String issuedTo, long issueDate, String type,
                String subscriptionType, String feature, String signature, long expiryDate, int maxNodes, long startDate)
{
    this.version = version;
    this.uid = uid;
    this.issuer = issuer;
    this.issuedTo = issuedTo;
    this.issueDate = issueDate;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.feature = feature;
    this.signature = signature;
    // We will validate that only a basic license can have the
    BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
    // in the validate() method.
    if (expiryDate == -1) {
        this.expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        this.expiryDate = expiryDate;
    }
    this.maxNodes = maxNodes;
    this.startDate = startDate;
    if (version == VERSION_START) {
        // in 1.x: the acceptable values for 'subscription_type': none | dev | silver | gold | platinum
        this.operationMode = OperationMode.resolve(subscriptionType);
    } else {
        // in 2.x: the acceptable values for 'type': trial | basic | silver | dev | gold | platinum
        this.operationMode = OperationMode.resolve(type);
    }
    validate();
}

/**
 * @return version of the license
 */
public int version() {
    return version;
}

/**
 * @return a unique identifier for a license
 */
public String uid() {
    return uid;
}

/**
 * @return type of the license [trial, subscription, internal]

```

```

*/
public String type() {
    return type;
}

/**
 * @return the issueDate in milliseconds
 */
public long issueDate() {
    return issueDate;
}

/**
 * @return the startDate in milliseconds
 */
public long startDate() {
    return startDate;
}

/**
 * @return the expiry date in milliseconds
 */
public long expiryDate() {
    return expiryDate;
}

/**
 * @return the maximum number of nodes this license has been issued for
 */
public int maxNodes() {
    return maxNodes;
}

/**
 * @return a string representing the entity this licenses has been issued to
 */
public String issuedTo() {
    return issuedTo;
}

/**
 * @return a string representing the entity responsible for issuing this license (internal)
 */
public String issuer() {
    return issuer;
}

/**

```

```

* @return a string representing the signature of the license used for license verification
*/
public String signature() {
    return signature;
}

/**
* @return the operation mode of the license as computed from the license type or from
* the license mode file
*/
public OperationMode operationMode() {
    synchronized (this) {
        if (canReadOperationModeFromFile() && operationModeFileWatcher != null) {
            return operationModeFileWatcher.getCurrentOperationMode();
        }
    }
    return operationMode;
}

private boolean canReadOperationModeFromFile() {
    return type.equals("cloud_internal");
}

private volatile OperationModeFileWatcher operationModeFileWatcher;

/**
* Sets the operation mode file watcher for the license and initializes the
* file watcher when the license type allows to override operation mode from file
*/
public synchronized void setOperationModeFileWatcher(final OperationModeFileWatcher
operationModeFileWatcher) {
    this.operationModeFileWatcher = operationModeFileWatcher;
    if (canReadOperationModeFromFile()) {
        this.operationModeFileWatcher.init();
    }
}

/**
* Removes operation mode file watcher, so unused license objects can be gc'ed
*/
public synchronized void removeOperationModeFileWatcher() {
    this.operationModeFileWatcher = null;
}

/**
* @return the current license's status
*/
public Status status() {

```



```

    long now = System.currentTimeMillis();
    if (issueDate > now) {
        return Status.INVALID;
    } else if (expiryDate < now) {
        return Status.EXPIRED;
    }
    return Status.ACTIVE;
}

private void validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (subscriptionType == null && version == VERSION_START) {
        throw new IllegalStateException("subscriptionType can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (feature == null && version == VERSION_START) {
        throw new IllegalStateException("feature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    } else if (expiryDate == LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
&& "basic".equals(type) == false) {
        throw new IllegalStateException("only basic licenses are allowed to have no expiration");
    }
}

public static License readLicense(StreamInput in) throws IOException {
    int version = in.readVInt(); // Version for future extensibility
    if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
elasticsearch-license" +
        " plugin");
    }
    Builder builder = builder();
    builder.version(version);
    builder.uid(in.readString());
    builder.type(in.readString());
    if (version == VERSION_START) {
        builder.subscriptionType(in.readString());
    }
}

```

```

builder.issueDate(in.readLong());
if (version == VERSION_START) {
    builder.feature(in.readString());
}
builder.expiryDate(in.readLong());
builder.maxNodes(in.readInt());
builder.issuedTo(in.readString());
builder.issuer(in.readString());
builder.signature(in.readOptionalString());
if (version >= VERSION_START_DATE) {
    builder.startDate(in.readLong());
}
return builder.build();
}

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(version);
    out.writeString(uid);
    out.writeString(type);
    if (version == VERSION_START) {
        out.writeString(subscriptionType);
    }
    out.writeLong(issueDate);
    if (version == VERSION_START) {
        out.writeString(feature);
    }
    out.writeLong(expiryDate);
    out.writeInt(maxNodes);
    out.writeString(issuedTo);
    out.writeString(issuer);
    out.writeOptionalString(signature);
    if (version >= VERSION_START_DATE) {
        out.writeLong(startDate);
    }
}

@Override
public String toString() {
    try {
        final XContentBuilder builder = XContentFactory.jsonBuilder();
        toXContent(builder, ToXContent.EMPTY_PARAMS);
        return Strings.toString(builder);
    } catch (IOException e) {
        return "";
    }
}

@Override

```

```

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    toInnerXContent(builder, params);
    builder.endObject();
    return builder;
}

public XContentBuilder toInnerXContent(XContentBuilder builder, Params params) throws IOException {
    boolean licenseSpecMode = params.paramAsBoolean(LICENSE_SPEC_VIEW_MODE, false);
    boolean restViewMode = params.paramAsBoolean(REST_VIEW_MODE, false);
    boolean previouslyHumanReadable = builder.humanReadable();
    if (licenseSpecMode && restViewMode) {
        throw new IllegalArgumentException("can have either " + REST_VIEW_MODE + " or " +
LICENSE_SPEC_VIEW_MODE);
    } else if (restViewMode) {
        if (!previouslyHumanReadable) {
            builder.humanReadable(true);
        }
    }
    final int version;
    if (params.param(LICENSE_VERSION_MODE) != null && restViewMode) {
        version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
    } else {
        version = this.version;
    }
    if (restViewMode) {
        builder.field(Fields.STATUS, status().label());
    }
    builder.field(Fields.UID, uid);
    builder.field(Fields.TYPE, type);
    if (version == VERSION_START) {
        builder.field(Fields.SUBSCRIPTION_TYPE, subscriptionType);
    }
    builder.timeField(Fields.ISSUE_DATE_IN_MILLIS, Fields.ISSUE_DATE, issueDate);
    if (version == VERSION_START) {
        builder.field(Fields.FEATURE, feature);
    }

    if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
        builder.timeField(Fields.EXPIRY_DATE_IN_MILLIS, Fields.EXPIRY_DATE, expiryDate);
    }
    builder.field(Fields.MAX_NODES, maxNodes);
    builder.field(Fields.ISSUED_TO, issuedTo);
    builder.field(Fields.ISSUER, issuer);
    if (!licenseSpecMode && !restViewMode && signature != null) {
        builder.field(Fields.SIGNATURE, signature);
    }
    if (restViewMode) {

```

```

        builder.humanReadable(previouslyHumanReadable);
    }
    if (version >= VERSION_START_DATE) {
        builder.timeField(Fields.START_DATE_IN_MILLIS, Fields.START_DATE, startDate);
    }
    return builder;
}

```

```

public static License fromXContent(XContentParser parser) throws IOException {
    Builder builder = new Builder();
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            token = parser.nextToken();
            if (token.isValue()) {
                if (Fields.UID.equals(currentFieldName)) {
                    builder.uid(parser.text());
                } else if (Fields.TYPE.equals(currentFieldName)) {
                    builder.type(parser.text());
                } else if (Fields.SUBSCRIPTION_TYPE.equals(currentFieldName)) {
                    builder.subscriptionType(parser.text());
                } else if (Fields.ISSUE_DATE.equals(currentFieldName)) {
                    builder.issueDate(parseDate(parser, "issue", false));
                } else if (Fields.ISSUE_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.issueDate(parser.longValue());
                } else if (Fields.FEATURE.equals(currentFieldName)) {
                    builder.feature(parser.text());
                } else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
                    builder.expiryDate(parseDate(parser, "expiration", true));
                } else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.expiryDate(parser.longValue());
                } else if (Fields.START_DATE.equals(currentFieldName)) {
                    builder.startDate(parseDate(parser, "start", false));
                } else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.startDate(parser.longValue());
                } else if (Fields.MAX_NODES.equals(currentFieldName)) {
                    builder.maxNodes(parser.intValue());
                } else if (Fields.ISSUED_TO.equals(currentFieldName)) {
                    builder.issuedTo(parser.text());
                } else if (Fields.ISSUER.equals(currentFieldName)) {
                    builder.issuer(parser.text());
                } else if (Fields.SIGNATURE.equals(currentFieldName)) {
                    builder.signature(parser.text());
                } else if (Fields.VERSION.equals(currentFieldName)) {
                    builder.version(parser.intValue());
                }
            }
            // Ignore unknown elements - might be new version of license

```

```

    } else if (token == XContentParser.Token.START_ARRAY) {
        // It was probably created by newer version - ignoring
        parser.skipChildren();
    } else if (token == XContentParser.Token.START_OBJECT) {
        // It was probably created by newer version - ignoring
        parser.skipChildren();
    }
}
}
// not a license spec
if (builder.signature != null) {
    byte[] signatureBytes = Base64.getDecoder().decode(builder.signature);
    ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
    int version = byteBuffer.getInt();
    // we take the absolute version, because negative versions
    // mean that the license was generated by the cluster (see TrialLicense)
    // and positive version means that the license was signed
    if (version < 0) {
        version *= -1;
    }
    if (version == 0) {
        throw new ElasticsearchException("malformed signature for license [" + builder.uid + "]");
    } else if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
" +
        "elasticsearch-license plugin");
    }
    // signature version is the source of truth
    builder.version(version);
}
return builder.build();
}

/**
 * Returns true if the license was auto-generated (by license plugin),
 * false otherwise
 */
public static boolean isAutoGeneratedLicense(String signature) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(signature);
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        return byteBuffer.getInt() < 0;
    } catch (IllegalArgumentException e) {
        throw new IllegalStateException(e);
    }
}

public static License fromSource(BytesReference bytes, XContentType xContentType) throws IOException {

```

```

if (bytes == null || bytes.length() == 0) {
    throw new ElasticsearchParseException("failed to parse license - no content provided");
}
if (xContentType == null) {
    throw new ElasticsearchParseException("failed to parse license - no content-type provided");
}
// EMPTY is safe here because we don't call namedObject
try (InputStream byteStream = bytes.streamInput();
    XContentParser parser = xContentType.xContent()
        .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE, byteStream))
{
    License license = null;
    if (parser.nextToken() == XContentParser.Token.START_OBJECT) {
        if (parser.nextToken() == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            if (Fields.LICENSES.equals(currentFieldName)) {
                final List<License> pre20Licenses = new ArrayList<>();
                if (parser.nextToken() == XContentParser.Token.START_ARRAY) {
                    while (parser.nextToken() != XContentParser.Token.END_ARRAY) {
                        pre20Licenses.add(License.fromXContent(parser));
                    }
                    // take the latest issued unexpired license
                    CollectionUtil.timSort(pre20Licenses, LATEST_ISSUE_DATE_FIRST);
                    long now = System.currentTimeMillis();
                    for (License oldLicense : pre20Licenses) {
                        if (oldLicense.expiryDate() > now) {
                            license = oldLicense;
                            break;
                        }
                    }
                    if (license == null && !pre20Licenses.isEmpty()) {
                        license = pre20Licenses.get(0);
                    }
                } else {
                    throw new ElasticsearchParseException("failed to parse licenses expected an array of licenses");
                }
            } else if (Fields.LICENSE.equals(currentFieldName)) {
                license = License.fromXContent(parser);
            }
            // Ignore all other fields - might be created with new version
        } else {
            throw new ElasticsearchParseException("failed to parse licenses expected field");
        }
    } else {
        throw new ElasticsearchParseException("failed to parse licenses expected start object");
    }
    return license;
}

```

```

}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    License license = (License) o;

    if (issueDate != license.issueDate) return false;
    if (expiryDate != license.expiryDate) return false;
    if (startDate != license.startDate) return false;
    if (maxNodes != license.maxNodes) return false;
    if (version != license.version) return false;
    if (uid != null ? !uid.equals(license.uid) : license.uid != null) return false;
    if (issuer != null ? !issuer.equals(license.issuer) : license.issuer != null) return false;
    if (issuedTo != null ? !issuedTo.equals(license.issuedTo) : license.issuedTo != null) return false;
    if (type != null ? !type.equals(license.type) : license.type != null) return false;
    if (subscriptionType != null ? !subscriptionType.equals(license.subscriptionType) : license.subscriptionType !=
null)
        return false;
    if (feature != null ? !feature.equals(license.feature) : license.feature != null) return false;
    return !(signature != null ? !signature.equals(license.signature) : license.signature != null);
}

@Override
public int hashCode() {
    int result = uid != null ? uid.hashCode() : 0;
    result = 31 * result + (issuer != null ? issuer.hashCode() : 0);
    result = 31 * result + (issuedTo != null ? issuedTo.hashCode() : 0);
    result = 31 * result + (int) (issueDate ^ (issueDate >>> 32));
    result = 31 * result + (type != null ? type.hashCode() : 0);
    result = 31 * result + (subscriptionType != null ? subscriptionType.hashCode() : 0);
    result = 31 * result + (feature != null ? feature.hashCode() : 0);
    result = 31 * result + (signature != null ? signature.hashCode() : 0);
    result = 31 * result + (int) (expiryDate ^ (expiryDate >>> 32));
    result = 31 * result + (int) (startDate ^ (startDate >>> 32));
    result = 31 * result + maxNodes;
    result = 31 * result + version;
    return result;
}

public static final class Fields {
    public static final String STATUS = "status";
    public static final String UID = "uid";
    public static final String TYPE = "type";
    public static final String SUBSCRIPTION_TYPE = "subscription_type";
}

```

```

public static final String ISSUE_DATE_IN_MILLIS = "issue_date_in_millis";
public static final String ISSUE_DATE = "issue_date";
public static final String FEATURE = "feature";
public static final String EXPIRY_DATE_IN_MILLIS = "expiry_date_in_millis";
public static final String EXPIRY_DATE = "expiry_date";
public static final String START_DATE_IN_MILLIS = "start_date_in_millis";
public static final String START_DATE = "start_date";
public static final String MAX_NODES = "max_nodes";
public static final String ISSUED_TO = "issued_to";
public static final String ISSUER = "issuer";
public static final String VERSION = "version";
public static final String SIGNATURE = "signature";

public static final String LICENSES = "licenses";
public static final String LICENSE = "license";

}

private static long parseDate(XContentParser parser, String description, boolean endOfDay) throws
IOException {
    if (parser.currentToken() == XContentParser.Token.VALUE_NUMBER) {
        return parser.longValue();
    } else {
        try {
            if (endOfDay) {
                return DateUtils.endOfDay(parser.text());
            } else {
                return DateUtils.beginningOfDay(parser.text());
            }
        } catch (IllegalArgumentException ex) {
            throw new ElasticsearchParseException("invalid " + description + " date format " + parser.text());
        }
    }
}

public static Builder builder() {
    return new Builder();
}

public static class Builder {
    private int version = License.VERSION_CURRENT;
    private String uid;
    private String issuer;
    private String issuedTo;
    private long issueDate = -1;
    private String type;
    private String subscriptionType;
    private String feature;

```



```
private String signature;
private long expiryDate = -1;
private long startDate = -1;
private int maxNodes = -1;

public Builder uid(String uid) {
    this.uid = uid;
    return this;
}

public Builder version(int version) {
    this.version = version;
    return this;
}

public Builder issuer(String issuer) {
    this.issuer = issuer;
    return this;
}

public Builder issuedTo(String issuedTo) {
    this.issuedTo = issuedTo;
    return this;
}

public Builder issueDate(long issueDate) {
    this.issueDate = issueDate;
    return this;
}

public Builder type(String type) {
    this.type = type;
    return this;
}

public Builder subscriptionType(String subscriptionType) {
    this.subscriptionType = subscriptionType;
    return this;
}

public Builder feature(String feature) {
    this.feature = feature;
    return this;
}

public Builder expiryDate(long expiryDate) {
    this.expiryDate = expiryDate;
    return this;
}
```

```

}

public Builder maxNodes(int maxNodes) {
    this.maxNodes = maxNodes;
    return this;
}

public Builder signature(String signature) {
    if (signature != null) {
        this.signature = signature;
    }
    return this;
}

public Builder startDate(long startDate) {
    this.startDate = startDate;
    return this;
}

public Builder fromLicenseSpec(License license, String signature) {
    return uid(license.uid())
        .version(license.version())
        .issuedTo(license.issuedTo())
        .issueDate(license.issueDate())
        .startDate(license.startDate())
        .type(license.type())
        .subscriptionType(license.subscriptionType)
        .feature(license.feature)
        .maxNodes(license.maxNodes())
        .expiryDate(license.expiryDate())
        .issuer(license.issuer())
        .signature(signature);
}

/**
 * Returns a builder that converts pre 2.0 licenses
 * to the new license format
 */
public Builder fromPre20LicenseSpec(License pre20License) {
    return uid(pre20License.uid())
        .issuedTo(pre20License.issuedTo())
        .issueDate(pre20License.issueDate())
        .maxNodes(pre20License.maxNodes())
        .expiryDate(pre20License.expiryDate());
}

public License build() {
    return new License(version, uid, issuer, issuedTo, issueDate, type,

```

```

        subscriptionType, feature, signature, expiryDate, maxNodes, startDate);
    }

    public Builder validate() {
        if (issuer == null) {
            throw new IllegalStateException("issuer can not be null");
        } else if (issuedTo == null) {
            throw new IllegalStateException("issuedTo can not be null");
        } else if (issueDate == -1) {
            throw new IllegalStateException("issueDate has to be set");
        } else if (type == null) {
            throw new IllegalStateException("type can not be null");
        } else if (uid == null) {
            throw new IllegalStateException("uid can not be null");
        } else if (signature == null) {
            throw new IllegalStateException("signature can not be null");
        } else if (maxNodes == -1) {
            throw new IllegalStateException("maxNodes has to be set");
        } else if (expiryDate == -1) {
            throw new IllegalStateException("expiryDate has to be set");
        }
        return this;
    }
}

public enum Status {

    ACTIVE("active"),
    INVALID("invalid"),
    EXPIRED("expired");

    private final String label;

    Status(String label) {
        this.label = label;
    }

    public String label() {
        return label;
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(label);
    }

    public static Status readFrom(StreamInput in) throws IOException {
        String value = in.readString();
        switch (value) {

```

```

        case "active":
            return ACTIVE;
        case "invalid":
            return INVALID;
        case "expired":
            return EXPIRED;
        default:
            throw new IllegalArgumentException("unknown license status [" + value + "]");
    }
}
}

/**
 * Returns <code>true</code> iff the license is a production licnese
 */
public boolean isProductionLicense() {
    switch (operationMode()) {
        case MISSING:
        case TRIAL:
        case BASIC:
            return false;
        case STANDARD:
        case GOLD:
        case PLATINUM:
            return true;
        default:
            throw new AssertionError("unknown operation mode: " + operationMode());
    }
}
}
}
}
/**
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.POST;

```

```

import static org.elasticsearch.rest.RestRequest.Method.PUT;

public class RestPutLicenseAction extends XPackRestHandler {

    public RestPutLicenseAction(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license", this);
        controller.registerHandler(PUT, URI_BASE + "/license", this);
    }

    @Override
    public String getName() {
        return "xpack_put_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        if (request.hasContent() == false) {
            throw new IllegalArgumentException("The license must be provided in the request body");
        }
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest();
        putLicenseRequest.license(request.content(), request.getXContentType());
        putLicenseRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        putLicenseRequest.timeout(request.paramAsTime("timeout", putLicenseRequest.timeout()));
        putLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
        putLicenseRequest.masterNodeTimeout()));

        if ("basic".equals(putLicenseRequest.license().type())) {
            throw new IllegalArgumentException("Installing basic licenses is no longer allowed. Use the POST " +
            "/_xpack/license/start_basic API to install a basic license that does not expire.");
        }

        return channel -> client.es().admin().cluster().execute(PutLicenseAction.INSTANCE, putLicenseRequest,
            new RestToXContentListener<>(channel));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

```

```

import java.io.IOException;

public class GetLicenseResponse extends ActionResponse {

    private License license;

    GetLicenseResponse() {
    }

    GetLicenseResponse(License license) {
        this.license = license;
    }

    public License license() {
        return license;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.readBoolean()) {
            license = License.readLicense(in);
        }
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        if (license == null) {
            out.writeBoolean(false);
        } else {
            out.writeBoolean(true);
            license.writeTo(out);
        }
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.MasterNodeReadOperationRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseRequestBuilder extends MasterNodeReadOperationRequestBuilder<GetLicenseRequest,

```

```

GetLicenseResponse,
    GetLicenseRequestBuilder> {

    public GetLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, GetLicenseAction.INSTANCE);
    }

    /**
     * Creates new get licenses request builder
     *
     * @param client elasticsearch client
     */
    public GetLicenseRequestBuilder(ElasticsearchClient client, GetLicenseAction action) {
        super(client, action, new GetLicenseRequest());
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetLicenseRequest extends MasterNodeReadRequest<GetLicenseRequest> {

    public GetLicenseRequest() {
    }

    public GetLicenseRequest(StreamInput in) throws IOException {
        super(in);
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
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```

```

*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartTrialAction extends TransportMasterNodeAction<PostStartTrialRequest,
PostStartTrialResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartTrialAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartTrialAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, PostStartTrialRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartTrialResponse newResponse() {
        return new PostStartTrialResponse();
    }

    @Override
    protected void masterOperation(PostStartTrialRequest request, ClusterState state,
                                   ActionListener<PostStartTrialResponse> listener) throws Exception {
        licenseService.startTrialLicense(request, listener);
    }

    @Override

```



```

protected ClusterBlockException checkBlock(PostStartTrialRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.GET;
import static org.elasticsearch.rest.RestStatus.NOT_FOUND;
import static org.elasticsearch.rest.RestStatus.OK;

public class RestGetLicenseAction extends XPackRestHandler {

    @Inject
    public RestGetLicenseAction(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license", this);
    }

    @Override
    public String getName() {
        return "xpack_get_license_action";
    }

    /**
     * There will be only one license displayed per feature, the selected license will have the latest expiry_date
     * out of all other licenses for the feature.
     * <p>

```

```

* The licenses are sorted by latest issue_date
*/
@Override
public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
IOException {
    final Map<String, String> overrideParams = new HashMap<>(2);
    overrideParams.put(License.REST_VIEW_MODE, "true");
    overrideParams.put(License.LICENSE_VERSION_MODE, String.valueOf(License.VERSION_CURRENT));
    final ToXContent.Params params = new ToXContent.DelegatingMapParams(overrideParams, request);
    GetLicenseRequest getLicenseRequest = new GetLicenseRequest();
    getLicenseRequest.local(request.paramAsBoolean("local", getLicenseRequest.local()));
    return channel -> client.es().admin().cluster().execute(GetLicenseAction.INSTANCE, getLicenseRequest,
        new RestBuilderListener<GetLicenseResponse>(channel) {
            @Override
            public RestResponse buildResponse(GetLicenseResponse response, XContentBuilder builder) throws
Exception {
                // Default to pretty printing, but allow ?pretty=false to disable
                if (!request.hasParam("pretty")) {
                    builder.prettyPrint().IfAtEnd();
                }
                boolean hasLicense = response.license() != null;
                builder.startObject();
                if (hasLicense) {
                    builder.startObject("license");
                    response.license().toInnerXContent(builder, params);
                    builder.endObject();
                }
                builder.endObject();
                return new BytesRestResponse(hasLicense ? OK : NOT_FOUND, builder);
            }
        });
}

}

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*/
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.XContentType;

/**
* Register license request builder

```

```

*/
public class PutLicenseRequestBuilder extends AcknowledgedRequestBuilder<PutLicenseRequest,
PutLicenseResponse, PutLicenseRequestBuilder> {

    public PutLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, PutLicenseAction.INSTANCE);
    }

    /**
     * Constructs register license request
     *
     * @param client elasticsearch client
     */
    public PutLicenseRequestBuilder(ElasticsearchClient client, PutLicenseAction action) {
        super(client, action, new PutLicenseRequest());
    }

    /**
     * Sets the license
     *
     * @param license license
     * @return this builder
     */
    public PutLicenseRequestBuilder setLicense(License license) {
        request.license(license);
        return this;
    }

    public PutLicenseRequestBuilder setLicense(BytesReference licenseSource, XContentType xContentType) {
        request.license(licenseSource, xContentType);
        return this;
    }

    public PutLicenseRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

```

```

public class GetBasicStatusAction extends Action<GetBasicStatusRequest, GetBasicStatusResponse,
GetBasicStatusRequestBuilder> {

    public static final GetBasicStatusAction INSTANCE = new GetBasicStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/basic_status";

    private GetBasicStatusAction() {
        super(NAME);
    }

    @Override
    public GetBasicStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetBasicStatusRequestBuilder(client, this);
    }

    @Override
    public GetBasicStatusResponse newResponse() {
        return new GetBasicStatusResponse();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.rest.RestStatus;

public class LicenseUtils {

    public static final String EXPIRED_FEATURE_METADATA = "es.license.expired.feature";

    /**
     * Exception to be thrown when a feature action requires a valid license, but license
     * has expired
     *
     * <code>feature</code> accessible through { @link #EXPIRED_FEATURE_METADATA } in the
     * exception's rest header
     */
    public static ElasticsearchSecurityException newComplianceException(String feature) {
        ElasticsearchSecurityException e = new ElasticsearchSecurityException("current license is non-compliant for
[{}]",
            RestStatus.FORBIDDEN, feature);
        e.addMetadata(EXPIRED_FEATURE_METADATA, feature);
        return e;
    }
}

```



```

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.function.Supplier;

import static org.elasticsearch.xpack.core.XPackPlugin.transportClientMode;

public class Licensing implements ActionPlugin {

    public static final String NAME = "license";
    protected final Settings settings;

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
    to this file
    // are also carried out in XPackClientPlugin.java
    public List<NamedWriteableRegistry.Entry> getNamedWriteables() {
        List<NamedWriteableRegistry.Entry> entries = new ArrayList<>();
        entries.add(new NamedWriteableRegistry.Entry(MetaData.Custom.class, LicensesMetaData.TYPE,
LicensesMetaData::new));
        entries.add(new NamedWriteableRegistry.Entry(NamedDiff.class, LicensesMetaData.TYPE,
LicensesMetaData::readDiffFrom));
        return entries;
    }

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
    to this file
    // are also carried out in XPackClientPlugin.java
    public List<NamedXContentRegistry.Entry> getNamedXContent() {
        List<NamedXContentRegistry.Entry> entries = new ArrayList<>();
        // Metadata
        entries.add(new NamedXContentRegistry.Entry(MetaData.Custom.class, new
ParseField(LicensesMetaData.TYPE),
        LicensesMetaData::fromXContent));
        return entries;
    }

    public Licensing(Settings settings) {
        this.settings = settings;
    }

    @Override
    public List<ActionHandler<? extends ActionRequest, ? extends ActionResponse>> getActions() {
        return Arrays.asList(new ActionHandler<>(PutLicenseAction.INSTANCE, TransportPutLicenseAction.class),
            new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class),
            new ActionHandler<>(DeleteLicenseAction.INSTANCE, TransportDeleteLicenseAction.class),
            new ActionHandler<>(PostStartTrialAction.INSTANCE, TransportPostStartTrialAction.class),
            new ActionHandler<>(GetTrialStatusAction.INSTANCE, TransportGetTrialStatusAction.class),

```

```

        new ActionHandler<>(PostStartBasicAction.INSTANCE, TransportPostStartBasicAction.class),
        new ActionHandler<>(GetBasicStatusAction.INSTANCE, TransportGetBasicStatusAction.class));
    }

    @Override
    public List<RestHandler> getRestHandlers(Settings settings, RestController restController, ClusterSettings
clusterSettings,
        IndexScopedSettings indexScopedSettings, SettingsFilter settingsFilter, IndexNameExpressionResolver
indexNameExpressionResolver,
        Supplier<DiscoveryNodes> nodesInCluster) {
        List<RestHandler> handlers = new ArrayList<>();
        handlers.add(new RestGetLicenseAction(settings, restController));
        handlers.add(new RestPutLicenseAction(settings, restController));
        handlers.add(new RestDeleteLicenseAction(settings, restController));
        handlers.add(new RestGetTrialStatus(settings, restController));
        handlers.add(new RestGetBasicStatus(settings, restController));
        handlers.add(new RestPostStartTrialLicense(settings, restController));
        handlers.add(new RestPostStartBasicLicense(settings, restController));
        return handlers;
    }

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
to this file
// are also carried out in XPackClientPlugin.java
    public List<Setting<?>> getSettings() {
        // TODO convert this wildcard to a real setting
        return Collections.singletonList(Setting.groupSetting("license.", Setting.Property.NodeScope));
    }

}
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*/
package org.elasticsearch.license;

import javax.crypto.BadPaddingException;
import javax.crypto.Cipher;
import javax.crypto.IllegalBlockSizeException;
import javax.crypto.NoSuchPaddingException;
import javax.crypto.SecretKey;
import javax.crypto.SecretKeyFactory;
import javax.crypto.spec.PBEKeySpec;
import javax.crypto.spec.SecretKeySpec;
import java.nio.charset.StandardCharsets;
import java.security.GeneralSecurityException;

```

```

import java.security.KeyFactory;
import java.security.MessageDigest;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.NoSuchAlgorithmException;
import java.security.InvalidKeyException;
import java.security.spec.InvalidKeySpecException;
import java.security.spec.PKCS8EncodedKeySpec;
import java.security.spec.X509EncodedKeySpec;
import java.util.Base64;

public class CryptUtils {
    // SALT must be at least 128bits for FIPS 140-2 compliance
    private static final byte[] SALT = {
        (byte) 0x74, (byte) 0x68, (byte) 0x69, (byte) 0x73,
        (byte) 0x69, (byte) 0x73, (byte) 0x74, (byte) 0x68,
        (byte) 0x65, (byte) 0x73, (byte) 0x61, (byte) 0x6C,
        (byte) 0x74, (byte) 0x77, (byte) 0x65, (byte) 0x75
    };
    private static final String KEY_ALGORITHM = "RSA";
    private static final char[] DEFAULT_PASS_PHRASE = "elasticsearch-license".toCharArray();
    private static final String KDF_ALGORITHM = "PBKDF2WithHmacSHA512";
    private static final int KDF_ITERATION_COUNT = 10000;
    private static final String CIPHER_ALGORITHM = "AES";
    // This can be changed to 256 once Java 9 is the minimum version
    // http://www.oracle.com/technetwork/java/javase/terms/readme/jdk9-readme-3852447.html#jce
    private static final int ENCRYPTION_KEY_LENGTH = 128;
    private static final SecureRandom RANDOM = new SecureRandom();

    /**
     * Read encrypted private key file content with default pass phrase
     */
    public static PrivateKey readEncryptedPrivateKey(byte[] fileContents) {
        return readEncryptedPrivateKey(fileContents, DEFAULT_PASS_PHRASE, false);
    }

    /**
     * Returns encrypted private key file content with default pass phrase
     */
    public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey) {
        return writeEncryptedPrivateKey(privateKey, DEFAULT_PASS_PHRASE);
    }

    /**
     * Read encrypted private key file content with provided <code>passPhrase</code>
     */
    public static PrivateKey readEncryptedPrivateKey(byte[] fileContents, char[] passPhrase, boolean preV4) {

```



```

byte[] keyBytes = preV4 ? decryptV3Format(fileContents) : decrypt(fileContents, passPhrase);
PKCS8EncodedKeySpec privateKeySpec = new PKCS8EncodedKeySpec(keyBytes);
try {
    return KeyFactory.getInstance(KEY_ALGORITHM).generatePrivate(privateKeySpec);
} catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
    throw new IllegalStateException(e);
}
}

/**
 * Read public key file content
 */
public static PublicKey readPublicKey(byte[] fileContents) {
    X509EncodedKeySpec publicKeySpec = new X509EncodedKeySpec(fileContents);
    try {
        return KeyFactory.getInstance(CryptUtils.KEY_ALGORITHM).generatePublic(publicKeySpec);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Returns encrypted public key file content with provided <code>passPhrase</code>
 */
public static byte[] writeEncryptedPublicKey(PublicKey publicKey) {
    X509EncodedKeySpec encodedKeySpec = new X509EncodedKeySpec(publicKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), DEFAULT_PASS_PHRASE);
}

/**
 * Returns encrypted private key file content with provided <code>passPhrase</code>
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey, char[] passPhrase) {
    PKCS8EncodedKeySpec encodedKeySpec = new PKCS8EncodedKeySpec(privateKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
 * Encrypts provided <code>data</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
static byte[] encrypt(byte[] data) {
    return encrypt(data, DEFAULT_PASS_PHRASE);
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
static byte[] decrypt(byte[] encryptedData) {

```

```

    return decrypt(encryptedData, DEFAULT_PASS_PHRASE);
}

/**
 * Encrypts provided <code>data</code> with <code>passPhrase</code>
 */
private static byte[] encrypt(byte[] data, char[] passPhrase) {
    try {
        final Cipher encryptionCipher = getEncryptionCipher(deriveSecretKey(passPhrase));
        return encryptionCipher.doFinal(data);
    } catch (IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>passPhrase</code>
 */
private static byte[] decrypt(byte[] encryptedData, char[] passPhrase) {
    try {
        final Cipher cipher = getDecryptionCipher(deriveSecretKey(passPhrase));
        return cipher.doFinal(encryptedData);
    } catch (IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}

static byte[] encryptV3Format(byte[] data) {
    try {
        SecretKey encryptionKey = getV3Key();
        final Cipher encryptionCipher = getEncryptionCipher(encryptionKey);
        return encryptionCipher.doFinal(pad(data, 20));
    } catch (GeneralSecurityException e) {
        throw new IllegalStateException(e);
    }
}

static byte[] decryptV3Format(byte[] data) {
    try {
        SecretKey decryptionKey = getV3Key();
        final Cipher decryptionCipher = getDecryptionCipher(decryptionKey);
        return unPad(decryptionCipher.doFinal(data));
    } catch (GeneralSecurityException e) {
        throw new IllegalStateException(e);
    }
}

private static SecretKey getV3Key() throws NoSuchAlgorithmException, InvalidKeySpecException {

```

```

final byte[] salt = {
    (byte) 0xA9, (byte) 0xA2, (byte) 0xB5, (byte) 0xDE,
    (byte) 0x2A, (byte) 0x8A, (byte) 0x9A, (byte) 0xE6
};
final byte[] passBytes = "elasticsearch-license".getBytes(StandardCharsets.UTF_8);
final byte[] digest = MessageDigest.getInstance("SHA-512").digest(passBytes);
final char[] hashedPassphrase = Base64.getEncoder().encodeToString(digest).toCharArray();
PBEKeySpec keySpec = new PBEKeySpec(hashedPassphrase, salt, 1024, 128);
byte[] shortKey = SecretKeyFactory.getInstance("PBESWithSHA1AndDESede").
    generateSecret(keySpec).getEncoded();
byte[] intermediaryKey = new byte[16];
for (int i = 0, j = 0; i < 16; i++) {
    intermediaryKey[i] = shortKey[j];
    if (++j == shortKey.length)
        j = 0;
}
return new SecretKeySpec(intermediaryKey, "AES");
}

private static SecretKey deriveSecretKey(char[] passPhrase) {
    try {
        PBEKeySpec keySpec = new PBEKeySpec(passPhrase, SALT, KDF_ITERATION_COUNT,
        ENCRYPTION_KEY_LENGTH);

        SecretKey secretKey = SecretKeyFactory.getInstance(KDF_ALGORITHM).
            generateSecret(keySpec);
        return new SecretKeySpec(secretKey.getEncoded(), CIPHER_ALGORITHM);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

private static Cipher getEncryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.ENCRYPT_MODE, secretKey);
}

private static Cipher getDecryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.DECRYPT_MODE, secretKey);
}

private static Cipher getCipher(int mode, SecretKey secretKey) {
    try {
        Cipher cipher = Cipher.getInstance(CIPHER_ALGORITHM);
        cipher.init(mode, secretKey, RANDOM);
        return cipher;
    } catch (NoSuchAlgorithmException | InvalidKeyException | NoSuchPaddingException e) {
        throw new IllegalStateException(e);
    }
}

```

```

}

private static byte[] pad(byte[] bytes, int length) {
    if (bytes.length >= length) {
        byte[] out = new byte[bytes.length + 1];
        System.arraycopy(bytes, 0, out, 0, bytes.length);
        out[bytes.length] = (byte) 1;
        return out;
    }

    byte[] out = new byte[length + 1];

    int i = 0;
    for (; i < bytes.length; i++)
        out[i] = bytes[i];

    int padded = length - i;

    // fill the rest with random bytes
    byte[] fill = new byte[padded - 1];
    RANDOM.nextBytes(fill);
    System.arraycopy(fill, 0, out, i, padded - 1);

    out[length] = (byte) (padded + 1);

    return out;
}

private static byte[] unPad(byte[] bytes) {
    int padded = (int) bytes[bytes.length - 1];
    int targetLength = bytes.length - padded;

    byte[] out = new byte[targetLength];

    System.arraycopy(bytes, 0, out, 0, targetLength);

    return out;
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;

```

```

import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

class PostStartTrialResponse extends ActionResponse {

    // Nodes Prior to 6.3 did not have NEED_ACKNOWLEDGEMENT as part of status
    enum Pre63Status {
        UPGRADED_TO_TRIAL,
        TRIAL_ALREADY_ACTIVATED;
    }
    enum Status {
        UPGRADED_TO_TRIAL(true, null, RestStatus.OK),
        TRIAL_ALREADY_ACTIVATED(false, "Operation failed: Trial was already activated.",
RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

        private final boolean isTrialStarted;

        private final String errorMessage;
        private final RestStatus restStatus;
        Status(boolean isTrialStarted, String errorMessage, RestStatus restStatus) {
            this.isTrialStarted = isTrialStarted;
            this.errorMessage = errorMessage;
            this.restStatus = restStatus;
        }

        boolean isTrialStarted() {
            return isTrialStarted;
        }

        String getErrorMessage() {
            return errorMessage;
        }

        RestStatus getRestStatus() {
            return restStatus;
        }
    }

    private Status status;
    private Map<String, String[]> acknowledgeMessages;

```

```

private String acknowledgeMessage;

PostStartTrialResponse() {
}

PostStartTrialResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartTrialResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage)
{
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    status = in.readEnum(Status.class);
    if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
        acknowledgeMessage = in.readOptionalString();
        int size = in.readVInt();
        Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            String feature = in.readString();
            int nMessages = in.readVInt();
            String[] messages = new String[nMessages];
            for (int j = 0; j < nMessages; j++) {
                messages[j] = in.readString();
            }
            acknowledgeMessages.put(feature, messages);
        }
        this.acknowledgeMessages = acknowledgeMessages;
    } else {
        this.acknowledgeMessages = Collections.emptyMap();
    }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        out.writeEnum(status);
        out.writeOptionalString(acknowledgeMessage);
    }
}

```

```

        out.writeVInt(acknowledgeMessages.size());
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            out.writeString(entry.getKey());
            out.writeVInt(entry.getValue().length);
            for (String message : entry.getValue()) {
                out.writeString(message);
            }
        }
    } else {
        if (status == Status.UPGRADED_TO_TRIAL) {
            out.writeEnum(Pre63Status.UPGRADED_TO_TRIAL);
        } else if (status == Status.TRIAL_ALREADY_ACTIVATED) {
            out.writeEnum(Pre63Status.TRIAL_ALREADY_ACTIVATED);
        } else {
            throw new IllegalArgumentException("Starting trial on node with version [" + Version.CURRENT + "]
requires " +
                "acknowledgement parameter.");
        }
    }
}

```

```

Map<String, String[]> getAcknowledgementMessages() {
    return acknowledgeMessages;
}

```

```

String getAcknowledgementMessage() {
    return acknowledgeMessage;
}
}

```

/*

```

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*/

```

```

package org.elasticsearch.license;

```

```

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.io.stream.Writable;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.xpack.core.XPackBuild;

```

```

import java.io.IOException;
import java.util.ArrayList;

```

```

import java.util.Collections;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.stream.Collectors;

public class XPackInfoResponse extends ActionResponse {

    @Nullable private BuildInfo buildInfo;
    @Nullable private LicenseInfo licenseInfo;
    @Nullable private FeatureSetsInfo featureSetsInfo;

    public XPackInfoResponse() {}

    public XPackInfoResponse(@Nullable BuildInfo buildInfo, @Nullable LicenseInfo licenseInfo, @Nullable
FeatureSetsInfo featureSetsInfo) {
        this.buildInfo = buildInfo;
        this.licenseInfo = licenseInfo;
        this.featureSetsInfo = featureSetsInfo;
    }

    /**
     * @return The build info (incl. build hash and timestamp)
     */
    public BuildInfo getBuildInfo() {
        return buildInfo;
    }

    /**
     * @return The current license info (incl. UID, type/mode. status and expiry date). May return { @code null}
when no
     *     license is currently installed.
     */
    public LicenseInfo getLicenseInfo() {
        return licenseInfo;
    }

    /**
     * @return The current status of the feature sets in X-Pack. Feature sets describe the features available/enabled in
X-Pack.
     */
    public FeatureSetsInfo getFeatureSetsInfo() {
        return featureSetsInfo;
    }

    @Override

```



```

public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    out.writeOptionalWriteable(buildInfo);
    out.writeOptionalWriteable(licenseInfo);
    out.writeOptionalWriteable(featureSetsInfo);
}

@Override
public void readFrom(StreamInput in) throws IOException {
    this.buildInfo = in.readOptionalWriteable(BuildInfo::new);
    this.licenseInfo = in.readOptionalWriteable(LicenseInfo::new);
    this.featureSetsInfo = in.readOptionalWriteable(FeatureSetsInfo::new);
}

public static class LicenseInfo implements ToXContentObject, Writeable {

    private final String uid;
    private final String type;
    private final String mode;
    private final long expiryDate;
    private final License.Status status;

    public LicenseInfo(License license) {
        this(license.uid(), license.type(), license.operationMode().name().toLowerCase(Locale.ROOT),
            license.status(), license.expiryDate());
    }

    public LicenseInfo(StreamInput in) throws IOException {
        this(in.readString(), in.readString(), in.readString(), License.Status.readFrom(in), in.readLong());
    }

    public LicenseInfo(String uid, String type, String mode, License.Status status, long expiryDate) {
        this.uid = uid;
        this.type = type;
        this.mode = mode;
        this.status = status;
        this.expiryDate = expiryDate;
    }

    public String getUid() {
        return uid;
    }

    public String getType() {
        return type;
    }

    public String getMode() {

```

```

        return mode;
    }

    public long getExpiryDate() {
        return expiryDate;
    }

    public License.Status getStatus() {
        return status;
    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        return builder.startObject()
            .field("uid", uid)
            .field("type", type)
            .field("mode", mode)
            .field("status", status.label())
            .timeField("expiry_date_in_millis", "expiry_date", expiryDate)
            .endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(uid);
        out.writeString(type);
        out.writeString(mode);
        status.writeTo(out);
        out.writeLong(expiryDate);
    }
}

public static class BuildInfo implements ToXContentObject, Writeable {

    private final String hash;
    private final String timestamp;

    public BuildInfo(XPackBuild build) {
        this(build.shortHash(), build.date());
    }

    public BuildInfo(StreamInput input) throws IOException {
        this(input.readString(), input.readString());
    }

    public BuildInfo(String hash, String timestamp) {
        this.hash = hash;
        this.timestamp = timestamp;
    }
}

```

```

public String getHash() {
    return hash;
}

public String getTimestamp() {
    return timestamp;
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    return builder.startObject()
        .field("hash", hash)
        .field("date", timestamp)
        .endObject();
}

public void writeTo(StreamOutput output) throws IOException {
    output.writeString(hash);
    output.writeString(timestamp);
}
}

public static class FeatureSetsInfo implements ToXContentObject, Writable {

    private final Map<String, FeatureSet> featureSets;

    public FeatureSetsInfo(StreamInput in) throws IOException {
        int size = in.readVInt();
        Map<String, FeatureSet> featureSets = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            FeatureSet featureSet = new FeatureSet(in);
            featureSets.put(featureSet.name, featureSet);
        }
        this.featureSets = Collections.unmodifiableMap(featureSets);
    }

    public FeatureSetsInfo(Set<FeatureSet> featureSets) {
        Map<String, FeatureSet> map = new HashMap<>(featureSets.size());
        for (FeatureSet featureSet : featureSets) {
            map.put(featureSet.name, featureSet);
        }
        this.featureSets = Collections.unmodifiableMap(map);
    }

    public Map<String, FeatureSet> getFeatureSets() {
        return featureSets;
    }
}

```

```

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    List<String> names = new
ArrayList<>(this.featureSets.keySet()).stream().sorted().collect(Collectors.toList());
    for (String name : names) {
        builder.field(name, featureSets.get(name), params);
    }
    return builder.endObject();
}

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(featureSets.size());
    for (FeatureSet featureSet : featureSets.values()) {
        featureSet.writeTo(out);
    }
}

public static class FeatureSet implements ToXContentObject, Writeable {

    private final String name;
    @Nullable private final String description;
    private final boolean available;
    private final boolean enabled;
    @Nullable private final Map<String, Object> nativeCodeInfo;

    public FeatureSet(StreamInput in) throws IOException {
        this(in.readString(), in.readOptionalString(), in.readBoolean(), in.readBoolean(),
            in.getVersion().onOrAfter(Version.V_5_4_0) ? in.readMap() : null);
    }

    public FeatureSet(String name, @Nullable String description, boolean available, boolean enabled,
        @Nullable Map<String, Object> nativeCodeInfo) {
        this.name = name;
        this.description = description;
        this.available = available;
        this.enabled = enabled;
        this.nativeCodeInfo = nativeCodeInfo;
    }

    public String name() {
        return name;
    }

    @Nullable
    public String description() {
        return description;
    }
}

```

```

    }

    public boolean available() {
        return available;
    }

    public boolean enabled() {
        return enabled;
    }

    @Nullable
    public Map<String, Object> nativeCodeInfo() {
        return nativeCodeInfo;
    }

    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        builder.startObject();
        if (description != null) {
            builder.field("description", description);
        }
        builder.field("available", available);
        builder.field("enabled", enabled);
        if (nativeCodeInfo != null) {
            builder.field("native_code_info", nativeCodeInfo);
        }
        return builder.endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(name);
        out.writeOptionalString(description);
        out.writeBoolean(available);
        out.writeBoolean(enabled);
        if (out.getVersion().onOrAfter(Version.V_5_4_0)) {
            out.writeMap(nativeCodeInfo);
        }
    }
}

}
}
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartBasicAction extends Action<PostStartBasicRequest, PostStartBasicResponse,
PostStartBasicRequestBuilder> {

    public static final PostStartBasicAction INSTANCE = new PostStartBasicAction();
    public static final String NAME = "cluster:admin/xpack/license/start_basic";

    private PostStartBasicAction() {
        super(NAME);
    }

    @Override
    public PostStartBasicRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartBasicRequestBuilder(client, this);
    }

    @Override
    public PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetBasicStatusRequestBuilder extends ActionRequestBuilder<GetBasicStatusRequest,
GetBasicStatusResponse,
    GetBasicStatusRequestBuilder> {

    GetBasicStatusRequestBuilder(ElasticsearchClient client, GetBasicStatusAction action) {
        super(client, action, new GetBasicStatusRequest());
    }
}
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartTrialRequest extends MasterNodeRequest<PostStartTrialRequest> {

    private boolean acknowledge = false;
    private String type;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartTrialRequest setType(String type) {
        this.type = type;
        return this;
    }

    public String getType() {
        return type;
    }

    public PostStartTrialRequest acknowledge(boolean acknowledge) {
        this.acknowledge = acknowledge;
        return this;
    }

    public boolean isAcknowledged() {
        return acknowledge;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
            type = in.readString();
            acknowledge = in.readBoolean();
        } else {
            type = "trial";
            acknowledge = true;
        }
    }
}

```

```

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        super.writeTo(out);
        out.writeString(type);
        out.writeBoolean(acknowledge);
    } else {
        if ("trial".equals(type) == false) {
            throw new IllegalArgumentException("All nodes in cluster must be version [" + version
                + "] or newer to start trial with a different type than 'trial'. Attempting to write to " +
                "a node with version [" + out.getVersion() + "] with trial type [" + type + "].");
        } else if (acknowledge == false) {
            throw new IllegalArgumentException("Request must be acknowledged to send to a node with a version " +
                "prior to [" + version + "]. Attempting to send request to node with version [" + out.getVersion() + "] "
+
                "without acknowledgement.");
        } else {
            super.writeTo(out);
        }
    }
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetTrialStatusAction extends TransportMasterNodeReadAction<GetTrialStatusRequest,
GetTrialStatusResponse> {

    @Inject
    public TransportGetTrialStatusAction(Settings settings, TransportService transportService, ClusterService

```



```

clusterService,
        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, GetTrialStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
        GetTrialStatusRequest::new, indexNameExpressionResolver);
}

@Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected GetTrialStatusResponse newResponse() {
    return new GetTrialStatusResponse();
}

@Override
protected void masterOperation(GetTrialStatusRequest request, ClusterState state,
        ActionListener<GetTrialStatusResponse> listener) throws Exception {
    LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
    listener.onResponse(new GetTrialStatusResponse(licensesMetaData == null ||
licensesMetaData.isEligibleForTrial()));
}

@Override
protected ClusterBlockException checkBlock(GetTrialStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.AckedClusterStateUpdateTask;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;

```

```

import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.AbstractLifecycleComponent;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.env.Environment;
import org.elasticsearch.gateway.GatewayService;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.time.Clock;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.concurrent.atomic.AtomicReference;

/**
 * Service responsible for managing {@link LicensesMetaData}.
 * <p>
 * On the master node, the service handles updating the cluster state when a new license is registered.
 * It also listens on all nodes for cluster state updates, and updates {@link XPackLicenseState} when
 * the license changes are detected in the cluster state.
 */
public class LicenseService extends AbstractLifecycleComponent implements ClusterStateListener,
SchedulerEngine.Listener {

    public static final Setting<String> SELF_GENERATED_LICENSE_TYPE = new
Setting<>("xpack.license.self_generated.type",
    (s) -> "basic", (s) -> {
        if (SelfGeneratedLicense.validSelfGeneratedType(s)) {
            return s;
        } else {
            throw new IllegalArgumentException("Illegal self generated license type [" + s + "]. Must be trial or basic.");
        }
    }, Setting.Property.NodeScope);

```

```

// pkg private for tests
static final TimeValue NON_BASIC_SELF_GENERATED_LICENSE_DURATION =
TimeValue.timeValueHours(30 * 24);

static final Set<String> VALID_TRIAL_TYPES = new HashSet<>(Arrays.asList("trial", "platinum", "gold"));

/**
 * Duration of grace period after a license has expired
 */
static final TimeValue GRACE_PERIOD_DURATION = days(7);

public static final long BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS =
Long.MAX_VALUE - days(365).millis();

private final ClusterService clusterService;

/**
 * The xpack feature state to update when license changes are made.
 */
private final XPackLicenseState licenseState;

/**
 * Currently active license
 */
private final AtomicReference<License> currentLicense = new AtomicReference<>();
private SchedulerEngine scheduler;
private final Clock clock;

/**
 * File watcher for operation mode changes
 */
private final OperationModeFileWatcher operationModeFileWatcher;

/**
 * Callbacks to notify relative to license expiry
 */
private List<ExpirationCallback> expirationCallbacks = new ArrayList<>();

/**
 * Max number of nodes licensed by generated trial license
 */
static final int SELF_GENERATED_LICENSE_MAX_NODES = 1000;

public static final String LICENSE_JOB = "licenseJob";

private static final FormatDateTimeFormatter DATE_FORMATTER = Joda.forPattern("EEEE, MMMMM dd,
yyyy", Locale.ROOT);

```

```

private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
To acknowledge the license, " +
    "please read the following messages and update the license again, this time with the \"acknowledge=true\"
parameter:";

```

```

public LicenseService(Settings settings, ClusterService clusterService, Clock clock, Environment env,
    ResourceWatcherService resourceWatcherService, XPackLicenseState licenseState) {
    super(settings);
    this.clusterService = clusterService;
    this.clock = clock;
    this.scheduler = new SchedulerEngine(clock);
    this.licenseState = licenseState;
    this.operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService,
        XPackPlugin.resolveConfigFile(env, "license_mode"), logger, () -> updateLicenseState(getLicense()));
    this.scheduler.register(this);
    populateExpirationCallbacks();
}

```

```

private void logExpirationWarning(long expirationMillis, boolean expired) {
    String expiredMsg = expired ? "expired" : "will expire";
    String general = LoggerMessageFormat.format(null, "License [{}] on [{}].\n" +
        "# If you have a new license, please update it. Otherwise, please reach out to\n" +
        "# your support contact.\n" +
        "# ", expiredMsg, DATE_FORMATTER.printer().print(expirationMillis));
    if (expired) {
        general = general.toUpperCase(Locale.ROOT);
    }
    StringBuilder builder = new StringBuilder(general);
    builder.append(System.lineSeparator());
    if (expired) {
        builder.append("# COMMERCIAL PLUGINS OPERATING WITH REDUCED FUNCTIONALITY");
    } else {
        builder.append("# Commercial plugins operate with reduced functionality on license expiration:");
    }
    XPackLicenseState.EXPIRATION_MESSAGES.forEach((feature, messages) -> {
        if (messages.length > 0) {
            builder.append(System.lineSeparator());
            builder.append("# - ");
            builder.append(feature);
            for (String message : messages) {
                builder.append(System.lineSeparator());
                builder.append("# - ");
                builder.append(message);
            }
        }
    });
    logger.warn("{} ", builder);
}

```

```

}

private void populateExpirationCallbacks() {
    expirationCallbacks.add(new ExpirationCallback.Pre(days(7), days(25), days(1)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Pre(days(0), days(7), TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Post(days(0), null, TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            // logged when grace period begins
            logExpirationWarning(license.expiryDate(), true);
        }
    });
}

/**
 * Registers new license in the cluster
 * Master only operation. Installs a new license on the master provided it is VALID
 */
public void registerLicense(final PutLicenseRequest request, final ActionListener<PutLicenseResponse> listener)
{
    final License newLicense = request.license();
    final long now = clock.millis();
    if (!LicenseVerifier.verifyLicense(newLicense) || newLicense.issueDate() > now || newLicense.startDate() >
now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.INVALID));
    } else if (newLicense.type().equals("basic")) {
        listener.onFailure(new IllegalArgumentException("Registering basic licenses is not allowed."));
    } else if (newLicense.expiryDate() < now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.EXPIRED));
    } else {
        if (!request.acknowledged()) {
            // TODO: ack messages should be generated on the master, since another node's cluster state may be
behind...
            final License currentLicense = getLicense();
            if (currentLicense != null) {
                Map<String, String[]> acknowledgeMessages = getAckMessages(newLicense, currentLicense);
                if (acknowledgeMessages.isEmpty() == false) {
                    // needs acknowledgement

```

```

        listener.onResponse(new PutLicenseResponse(false, LicensesStatus.VALID,
ACKNOWLEDGEMENT_HEADER,
        acknowledgeMessages));
        return;
    }
}

if (newLicense.isProductionLicense()
    && XPackSettings.SECURITY_ENABLED.get(settings)
    && XPackSettings.TRANSPORT_SSL_ENABLED.get(settings) == false
    && isProductionMode(settings, clusterService.localNode()) {
    // security is on but TLS is not configured we gonna fail the entire request and throw an exception
    throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
        "] license unless TLS is configured or security is disabled");
    // TODO we should really validate that all nodes have xpack installed and are consistently configured but
this
    // should happen on a different level and not in this code
} else {
    clusterService.submitStateUpdateTask("register license [" + newLicense.uid() + "]", new
        AckedClusterStateUpdateTask<PutLicenseResponse>(request, listener) {
            @Override
            protected PutLicenseResponse newResponse(boolean acknowledged) {
                return new PutLicenseResponse(acknowledged, LicensesStatus.VALID);
            }
        }

        @Override
        public ClusterState execute(ClusterState currentState) throws Exception {
            XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
            Metadata currentMetadata = currentState.metadata();
            LicensesMetadata licensesMetadata = currentMetadata.custom(LicensesMetadata.TYPE);
            Version trialVersion = null;
            if (licensesMetadata != null) {
                trialVersion = licensesMetadata.getMostRecentTrialVersion();
            }
            Metadata.Builder mdBuilder = Metadata.builder(currentMetadata);
            mdBuilder.putCustom(LicensesMetadata.TYPE, new LicensesMetadata(newLicense,
trialVersion));
            return ClusterState.builder(currentState).metadata(mdBuilder).build();
        }
    });
}
}

public static Map<String, String[]> getAckMessages(License newLicense, License currentLicense) {
    Map<String, String[]> acknowledgeMessages = new HashMap<>();
    if (!License.isAutoGeneratedLicense(currentLicense.signature()) // current license is not auto-generated

```

```

        && currentLicense.issueDate() > newLicense.issueDate()) { // and has a later issue date
        acknowledgeMessages.put("license", new String[]{
            "The new license is older than the currently installed license. " +
            "Are you sure you want to override the current license?" });
        }
    XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.forEach((feature, ackMessages) -> {
        String[] messages = ackMessages.apply(currentLicense.operationMode(), newLicense.operationMode());
        if (messages.length > 0) {
            acknowledgeMessages.put(feature, messages);
        }
    });
    return acknowledgeMessages;
}

private static TimeValue days(int days) {
    return TimeValue.timeValueHours(days * 24);
}

@Override
public void triggered(SchedulerEngine.Event event) {
    final LicensesMetaData licensesMetaData =
clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    if (licensesMetaData != null) {
        final License license = licensesMetaData.getLicense();
        if (event.getJobName().equals(LICENSE_JOB)) {
            updateLicenseState(license);
        } else if (event.getJobName().startsWith(ExpirationCallback.EXPIRATION_JOB_PREFIX)) {
            expirationCallbacks.stream()
                .filter(expirationCallback -> expirationCallback.getId().equals(event.getJobName()))
                .forEach(expirationCallback -> expirationCallback.on(license));
        }
    }
}

/**
 * Remove license from the cluster state metadata
 */
public void removeLicense(final DeleteLicenseRequest request, final
ActionListener<ClusterStateUpdateResponse> listener) {
    clusterService.submitStateUpdateTask("delete license",
        new AckedClusterStateUpdateTask<ClusterStateUpdateResponse>(request, listener) {
        @Override
        protected ClusterStateUpdateResponse newResponse(boolean acknowledged) {
            return new ClusterStateUpdateResponse(acknowledged);
        }
    });
}

@Override

```

```

    public ClusterState execute(ClusterState currentState) throws Exception {
        Metadata metaData = currentState.metaData();
        final LicensesMetadata currentLicenses = metaData.custom(LicensesMetadata.TYPE);
        if (currentLicenses.getLicense() != LicensesMetadata.LICENSE_TOMBSTONE) {
            Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
            LicensesMetadata newMetadata = new
LicensesMetadata(LicensesMetadata.LICENSE_TOMBSTONE,
                    currentLicenses.getMostRecentTrialVersion());
            mdBuilder.putCustom(LicensesMetadata.TYPE, newMetadata);
            return ClusterState.builder(currentState).metaData(mdBuilder).build();
        } else {
            return currentState;
        }
    }
});
}

public License getLicense() {
    final License license = getLicense(clusterService.state().metaData());
    return license == LicensesMetadata.LICENSE_TOMBSTONE ? null : license;
}

void startTrialLicense(PostStartTrialRequest request, final ActionListener<PostStartTrialResponse> listener) {
    if (VALID_TRIAL_TYPES.contains(request.getType()) == false) {
        throw new IllegalArgumentException("Cannot start trial of type [" + request.getType() + "]. Valid trial types
are "
            + VALID_TRIAL_TYPES + ".");
    }
    StartTrialClusterTask task = new StartTrialClusterTask(logger, clusterService.getClusterName().value(), clock,
request, listener);
    clusterService.submitStateUpdateTask("started trial license", task);
}

void startBasicLicense(PostStartBasicRequest request, final ActionListener<PostStartBasicResponse> listener) {
    StartBasicClusterTask task = new StartBasicClusterTask(logger, clusterService.getClusterName().value(),
clock, request, listener);
    clusterService.submitStateUpdateTask("start basic license", task);
}

/**
 * Master-only operation to generate a one-time global self generated license.
 * The self generated license is only generated and stored if the current cluster state metadata
 * has no existing license. If the cluster currently has a basic license that has an expiration date,
 * a new basic license with no expiration date is generated.
 */
private void registerOrUpdateSelfGeneratedLicense() {
    clusterService.submitStateUpdateTask("maybe generate license for cluster",
        new StartupSelfGeneratedLicenseTask(settings, clock, clusterService));
}

```



```

}

@Override
protected void doStart() throws ElasticsearchException {
    clusterService.addListener(this);
    scheduler.start(Collections.emptyList());
    logger.debug("initializing license state");
    if (clusterService.lifecycleState() == Lifecycle.State.STARTED) {
        final ClusterState clusterState = clusterService.state();
        if (clusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK) == false
        &&
            clusterState.nodes().getMasterNode() != null &&
            XPackPlugin.isReadyForXPackCustomMetadata(clusterState)) {
            final LicensesMetaData currentMetaData = clusterState.metaData().custom(LicensesMetaData.TYPE);
            boolean noLicense = currentMetaData == null || currentMetaData.getLicense() == null;
            if (clusterState.getNodes().isLocalNodeElectedMaster() &&
                (noLicense || LicenseUtils.licenseNeedsExtended(currentMetaData.getLicense()))) {
                // triggers a cluster changed event eventually notifying the current licensee
                registerOrUpdateSelfGeneratedLicense();
            }
        }
    }
}

@Override
protected void doStop() throws ElasticsearchException {
    clusterService.removeListener(this);
    scheduler.stop();
    // clear current license
    currentLicense.set(null);
}

@Override
protected void doClose() throws ElasticsearchException {
}

/**
 * When there is no global block on { @link
org.elasticsearch.gateway.GatewayService#STATE_NOT_RECOVERED_BLOCK}
 * notify licensees and issue auto-generated license if no license has been installed/issued yet.
 */
@Override
public void clusterChanged(ClusterChangedEvent event) {
    final ClusterState previousClusterState = event.previousState();
    final ClusterState currentClusterState = event.state();
    if (!currentClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)) {
        if (XPackPlugin.isReadyForXPackCustomMetadata(currentClusterState) == false) {
            logger.debug("cannot add license to cluster as the following nodes might not understand the license

```

```

metadata: {}",
    () -> XPackPlugin.nodesNotReadyForXPackCustomMetadata(currentClusterState));
    return;
}

    final LicensesMetaData prevLicensesMetaData =
previousClusterState.getMetaData().custom(LicensesMetaData.TYPE);
    final LicensesMetaData currentLicensesMetaData =
currentClusterState.getMetaData().custom(LicensesMetaData.TYPE);
    if (logger.isDebugEnabled()) {
        logger.debug("previous [{}]", prevLicensesMetaData);
        logger.debug("current [{}]", currentLicensesMetaData);
    }
    // notify all interested plugins
    if (previousClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)
        || prevLicensesMetaData == null) {
        if (currentLicensesMetaData != null) {
            onUpdate(currentLicensesMetaData);
        }
    } else if (!prevLicensesMetaData.equals(currentLicensesMetaData)) {
        onUpdate(currentLicensesMetaData);
    }

    License currentLicense = null;
    boolean noLicenseInPrevMetadata = prevLicensesMetaData == null || prevLicensesMetaData.getLicense()
== null;
    if (noLicenseInPrevMetadata == false) {
        currentLicense = prevLicensesMetaData.getLicense();
    }
    boolean noLicenseInCurrentMetadata = (currentLicensesMetaData == null ||
currentLicensesMetaData.getLicense() == null);
    if (noLicenseInCurrentMetadata == false) {
        currentLicense = currentLicensesMetaData.getLicense();
    }

    boolean noLicense = noLicenseInPrevMetadata && noLicenseInCurrentMetadata;
    // auto-generate license if no licenses ever existed or if the current license is basic and
    // needs extended or if the license signature needs to be updated. this will trigger a subsequent cluster changed
event
    if (currentClusterState.getNodes().isLocalNodeElectedMaster() &&
        (noLicense || LicenseUtils.licenseNeedsExtended(currentLicense) ||
LicenseUtils.signatureNeedsUpdate(currentLicense))) {
        registerOrUpdateSelfGeneratedLicense();
    }
} else if (logger.isDebugEnabled()) {
    logger.debug("skipped license notifications reason: [{}]",
GatewayService.STATE_NOT_RECOVERED_BLOCK);
}

```

```

}

protected void updateLicenseState(final License license) {
    if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
        // implies license has been explicitly deleted
        licenseState.update(License.OperationMode.MISSING, false);
        return;
    }
    if (license != null) {
        long time = clock.millis();
        boolean active;
        if (license.expiryDate() == BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
            active = true;
        } else {
            // We subtract the grace period from the current time to avoid overflowing on an expiration
            // date that is near Long.MAX_VALUE
            active = time >= license.issueDate() && time - GRACE_PERIOD_DURATION.getMillis() <
license.expiryDate();
        }
        licenseState.update(license.operationMode(), active);

        if (active) {
            if (time < license.expiryDate()) {
                logger.debug("license [{}] - valid", license.uid());
            } else {
                logger.warn("license [{}] - grace", license.uid());
            }
        } else {
            logger.warn("license [{}] - expired", license.uid());
        }
    }
}

/**
 * Notifies registered licensees of license state change and/or new active license
 * based on the license in <code>currentLicensesMetaData</code>.
 * Additionally schedules license expiry notifications and event callbacks
 * relative to the current license's expiry
 */
private void onUpdate(final LicensesMetaData currentLicensesMetaData) {
    final License license = getLicense(currentLicensesMetaData);
    // license can be null if the trial license is yet to be auto-generated
    // in this case, it is a no-op
    if (license != null) {
        final License previousLicense = currentLicense.get();
        if (license.equals(previousLicense) == false) {
            currentLicense.set(license);
            license.setOperationModeFileWatcher(operationModeFileWatcher);
        }
    }
}

```

```

scheduler.add(new SchedulerEngine.Job(LICENSE_JOB, nextLicenseCheck(license)));
for (ExpirationCallback expirationCallback : expirationCallbacks) {
    scheduler.add(new SchedulerEngine.Job(expirationCallback.getId(),
        (startTime, now) ->
            expirationCallback.nextScheduledTimeForExpiry(license.expiryDate(), startTime, now)));
}
if (previousLicense != null) {
    // remove operationModeFileWatcher to gc the old license object
    previousLicense.removeOperationModeFileWatcher();
}
logger.info("license [{}] mode [{}] - valid", license.uid(),
    license.operationMode().name().toLowerCase(Locale.ROOT));
}
updateLicenseState(license);
}
}

```

// pkg private for tests

```

static SchedulerEngine.Schedule nextLicenseCheck(License license) {
    return (startTime, time) -> {
        if (time < license.issueDate()) {
            // when we encounter a license with a future issue date
            // which can happen with autogenerated license,
            // we want to schedule a notification on the license issue date
            // so the license is notified once it is valid
            // see https://github.com/elastic/x-plugins/issues/983
            return license.issueDate();
        } else if (time < license.expiryDate()) {
            return license.expiryDate();
        } else if (time < license.expiryDate() + GRACE_PERIOD_DURATION.getMillis()) {
            return license.expiryDate() + GRACE_PERIOD_DURATION.getMillis();
        }
        return -1; // license is expired, no need to check again
    };
}

```

```

public static License getLicense(final Metadata metaData) {
    final LicensesMetadata licensesMetadata = metaData.custom(LicensesMetadata.TYPE);
    return getLicense(licensesMetadata);
}

```

```

static License getLicense(final LicensesMetadata metaData) {
    if (metaData != null) {
        License license = metaData.getLicense();
        if (license == LicensesMetadata.LICENSE_TOMBSTONE) {
            return license;
        } else if (license != null) {
            boolean autoGeneratedLicense = License.isAutoGeneratedLicense(license.signature());

```

```

        if ((autoGeneratedLicense && SelfGeneratedLicense.verify(license))
            || (!autoGeneratedLicense && LicenseVerifier.verifyLicense(license))) {
            return license;
        }
    }
}
return null;
}

private static boolean isProductionMode(Settings settings, DiscoveryNode localNode) {
    final boolean singleNodeDisco = "single-
node".equals(DiscoveryModule.DISCOVERY_TYPE_SETTING.get(settings));
    return singleNodeDisco == false && isBoundToLoopback(localNode) == false;
}

private static boolean isBoundToLoopback(DiscoveryNode localNode) {
    return localNode.getAddress().address().isLoopbackAddress();
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartTrialAction extends Action<PostStartTrialRequest, PostStartTrialResponse,
PostStartTrialRequestBuilder> {

    public static final PostStartTrialAction INSTANCE = new PostStartTrialAction();
    public static final String NAME = "cluster:admin/xpack/license/start_trial";

    private PostStartTrialAction() {
        super(NAME);
    }

    @Override
    public PostStartTrialRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartTrialRequestBuilder(client, this);
    }

    @Override
    public PostStartTrialResponse newResponse() {
        return new PostStartTrialResponse();
    }
}

```

```

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.rest.action.RestBuilderListener;

public class LicensingClient {

    private final ElasticsearchClient client;

    public LicensingClient(ElasticsearchClient client) {
        this.client = client;
    }

    public PutLicenseRequestBuilder preparePutLicense(License license) {
        return new PutLicenseRequestBuilder(client).setLicense(license);
    }

    public void putLicense(PutLicenseRequest request, ActionListener<PutLicenseResponse> listener) {
        client.execute(PutLicenseAction.INSTANCE, request, listener);
    }

    public GetLicenseRequestBuilder prepareGetLicense() {
        return new GetLicenseRequestBuilder(client);
    }

    public void getLicense(GetLicenseRequest request, ActionListener<GetLicenseResponse> listener) {
        client.execute(GetLicenseAction.INSTANCE, request, listener);
    }

    public DeleteLicenseRequestBuilder prepareDeleteLicense() {
        return new DeleteLicenseRequestBuilder(client);
    }

    public void deleteLicense(DeleteLicenseRequest request, ActionListener<DeleteLicenseResponse> listener) {
        client.execute(DeleteLicenseAction.INSTANCE, request, listener);
    }

    public PostStartTrialRequestBuilder preparePostStartTrial() {
        return new PostStartTrialRequestBuilder(client, PostStartTrialAction.INSTANCE);
    }
}

```

```

public GetTrialStatusRequestBuilder prepareGetStartTrial() {
    return new GetTrialStatusRequestBuilder(client, GetTrialStatusAction.INSTANCE);
}

public void postStartTrial(PostStartTrialRequest request, ActionListener<PostStartTrialResponse> listener) {
    client.execute(PostStartTrialAction.INSTANCE, request, listener);
}

public void postStartBasic(PostStartBasicRequest request, ActionListener<PostStartBasicResponse> listener) {
    client.execute(PostStartBasicAction.INSTANCE, request, listener);
}

public PostStartBasicRequestBuilder preparePostStartBasic() {
    return new PostStartBasicRequestBuilder(client, PostStartBasicAction.INSTANCE);
}

public GetBasicStatusRequestBuilder prepareGetStartBasic() {
    return new GetBasicStatusRequestBuilder(client, GetBasicStatusAction.INSTANCE);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetBasicStatus extends XPackRestHandler {

    RestGetBasicStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/basic_status", this);
    }
}

```

```

@Override
protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
{
    return channel -> client.licensing().prepareGetStartBasic().execute(
        new RestBuilderListener<GetBasicStatusResponse>(channel) {
            @Override
            public RestResponse buildResponse(GetBasicStatusResponse response, XContentBuilder builder)
throws Exception {
                builder.startObject();
                builder.field("eligible_to_start_basic", response.isEligibleToStartBasic());
                builder.endObject();
                return new BytesRestResponse(RestStatus.OK, builder);
            }
        });
}

```

```

@Override
public String getName() {
    return "xpack_basic_status_action";
}
}

```

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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.

*/

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
```

```
import java.io.IOException;
```

```
public class DeleteLicenseRequest extends AcknowledgedRequest<DeleteLicenseRequest> {
```

```
    public DeleteLicenseRequest() {
    }

```

```

@Override
public ActionRequestValidationException validate() {
    return null;
}

```

```

@Override

```



```

public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.UUID;

public class StartupSelfGeneratedLicenseTask extends ClusterStateUpdateTask {

    /**
     * Max number of nodes licensed by generated trial license
     */
    private int selfGeneratedLicenseMaxNodes = 1000;

    private final Settings settings;
    private final Clock clock;
    private final ClusterService clusterService;
    private final Logger logger;

    public StartupSelfGeneratedLicenseTask(Settings settings, Clock clock, ClusterService clusterService) {
        this.settings = settings;
        this.clock = clock;
        this.clusterService = clusterService;
    }

```

```

    this.logger = Loggers.getLogger(getClass(), settings);
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData licensesMetaData = newState.metaData().custom(LicensesMetaData.TYPE);
    if (logger.isDebugEnabled()) {
        logger.debug("registered self generated license: {}", licensesMetaData);
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    final MetaData metaData = currentState.metaData();
    final LicensesMetaData currentLicensesMetaData = metaData.custom(LicensesMetaData.TYPE);
    // do not generate a license if any license is present
    if (currentLicensesMetaData == null) {
        String type = LicenseService.SELF_GENERATED_LICENSE_TYPE.get(settings);
        if (SelfGeneratedLicense.validSelfGeneratedType(type) == false) {
            throw new IllegalArgumentException("Illegal self generated license type [" + type +
                "]. Must be trial or basic.");
        }
        return updateWithLicense(currentState, type);
    } else if (LicenseUtils.licenseNeedsExtended(currentLicensesMetaData.getLicense())) {
        return extendBasic(currentState, currentLicensesMetaData);
    } else if (LicenseUtils.signatureNeedsUpdate(currentLicensesMetaData.getLicense())) {
        return updateLicenseSignature(currentState, currentLicensesMetaData);
    } else {
        return currentState;
    }
}

private ClusterState updateLicenseSignature(ClusterState currentState, LicensesMetaData
currentLicenseMetaData) {
    License license = currentLicenseMetaData.getLicense();
    MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
    String type = license.type();
    long issueDate = license.issueDate();
    long expiryDate;
    if ("basic".equals(type)) {
        expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
    }
    License.Builder specBuilder = License.builder()
        .uid(license.uid())

```

```

        .issuedTo(license.issuedTo())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(issueDate)
        .type(type)
        .expiryDate(expiryDate);
License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
Version trialVersion = currentLicenseMetaData.getMostRecentTrialVersion();
LicensesMetaData newLicenseMetadata = new LicensesMetaData(selfGeneratedLicense, trialVersion);
mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(("Supplier<?> () -> new ParameterizedMessage(\"unexpected failure during [{}]", source), e);
}

private ClusterState extendBasic(ClusterState currentState, LicensesMetaData currentLicenseMetadata) {
    License license = currentLicenseMetadata.getLicense();
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    LicensesMetaData newLicenseMetadata = createBasicLicenseFromExistingLicense(currentLicenseMetadata);
    mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
    logger.info("Existing basic license has an expiration. Basic licenses no longer expire." +
        "Regenerating license.\n\nOld license:\n {} \n\n New license:\n{}", license,
newLicenseMetadata.getLicense());
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

private LicensesMetaData createBasicLicenseFromExistingLicense(LicensesMetaData currentLicenseMetadata) {
    License currentLicense = currentLicenseMetadata.getLicense();
    License.Builder specBuilder = License.builder()
        .uid(currentLicense.uid())
        .issuedTo(currentLicense.issuedTo())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(currentLicense.issueDate())
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
    Version trialVersion = currentLicenseMetadata.getMostRecentTrialVersion();
    return new LicensesMetaData(selfGeneratedLicense, trialVersion);
}

private ClusterState updateWithLicense(ClusterState currentState, String type) {
    long issueDate = clock.millis();
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    long expiryDate;
    if ("basic".equals(type)) {
        expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    }
}

```

```

    } else {
        expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
    }
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo(clusterService.getClusterName().value())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(issueDate)
        .type(type)
        .expiryDate(expiryDate);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
    LicensesMetaData licensesMetaData;
    if ("trial".equals(type)) {
        licensesMetaData = new LicensesMetaData(selfGeneratedLicense, Version.CURRENT);
    } else {
        licensesMetaData = new LicensesMetaData(selfGeneratedLicense, null);
    }
    mdBuilder.putCustom(LicensesMetaData.TYPE, licensesMetaData);
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.license.PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT;

class PostStartBasicResponse extends AcknowledgedResponse {

    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeMessage;

    enum Status {

```

```

GENERATED_BASIC(true, null, RestStatus.OK),
ALREADY_USING_BASIC(false, "Operation failed: Current license is basic.", RestStatus.FORBIDDEN),
NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

private final boolean isBasicStarted;
private final String errorMessage;
private final RestStatus restStatus;

Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
    this.isBasicStarted = isBasicStarted;
    this.errorMessage = errorMessage;
    this.restStatus = restStatus;
}

boolean isBasicStarted() {
    return isBasicStarted;
}

String getErrorMessage() {
    return errorMessage;
}

RestStatus getRestStatus() {
    return restStatus;
}

private Status status;

PostStartBasicResponse() {
}

PostStartBasicResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartBasicResponse(Status status, Map<String, String[]> acknowledgeMessages, String
acknowledgeMessage) {
    super(status != NEED_ACKNOWLEDGEMENT);
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

```

```

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
    status = in.readEnum(Status.class);
    acknowledgeMessage = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

```

```

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
    out.writeEnum(status);
    out.writeOptionalString(acknowledgeMessage);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}

```

```

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    if (status.isBasicStarted()) {
        builder.field("basic_was_started", true);
    } else {
        builder.field("basic_was_started", false);
        builder.field("error_message", status.getErrorMessage());
    }
    if (acknowledgeMessages.isEmpty() == false) {
        builder.startObject("acknowledge");
        builder.field("message", acknowledgeMessage);
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {

```

```

        builder.startArray(entry.getKey());
        for (String message : entry.getValue()) {
            builder.value(message);
        }
        builder.endArray();
    }
    builder.endObject();
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.joda.time.MutableDateTime;
import org.joda.time.format.DateTimeFormatter;
import org.joda.time.format.ISODateTimeFormat;

public class DateUtils {

    private static final FormatDateTimeFormatter formatDateOnlyFormatter = Joda.forPattern("yyyy-MM-dd");

    private static final DateTimeFormatter dateOnlyFormatter = formatDateOnlyFormatter.parser().withZoneUTC();

    private static final DateTimeFormatter dateTimeFormatter = ISODateTimeFormat.dateTime().withZoneUTC();

    public static long endOfDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
            dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
            return dateTime.getMillis();
        }
    }

    public static long beginningOfDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {

```

```

        // Fall back to the date only format
        return dateOnlyFormatter.parseDateTime(date).getMillis();
    }

}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseRequestBuilder extends AcknowledgedRequestBuilder<DeleteLicenseRequest,
DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

    public DeleteLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, DeleteLicenseAction.INSTANCE);
    }

    /**
     * Creates new get licenses request builder
     *
     * @param client elasticsearch client
     */
    public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
        super(client, action, new DeleteLicenseRequest());
    }
}
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 */
package org.elasticsearch.license;

public enum LicensesStatus {
    VALID((byte) 0),
    INVALID((byte) 1),
    EXPIRED((byte) 2);

    private final byte id;

    LicensesStatus(byte id) {

```



```

        this.id = id;
    }

    public int id() {
        return id;
    }

    public static LicensesStatus fromId(int id) {
        if (id == 0) {
            return VALID;
        } else if (id == 1) {
            return INVALID;
        } else if (id == 2) {
            return EXPIRED;
        } else {
            throw new IllegalStateException("no valid LicensesStatus for id=" + id);
        }
    }
}
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 */

/**
 * Licensing for xpack.
 *
 * A {@link org.elasticsearch.license.License} is a signed set of json properties that determine what features
 * are available in a running cluster. Licenses are registered through a
 * {@link org.elasticsearch.license.PutLicenseRequest}. This action is handled by the master node, which places
 * the signed license into the cluster state. Each node listens for cluster state updates via the
 * {@link org.elasticsearch.license.LicenseService}, and updates its local copy of the license when it detects
 * changes in the cluster state.
 *
 * The logic for which features are available given the current license is handled by
 * {@link org.elasticsearch.license.XPackLicenseState}, which is updated by the
 * {@link org.elasticsearch.license.LicenseService} when the license changes.
 */
package org.elasticsearch.license;
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;

```

```

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPutLicenseAction extends TransportMasterNodeAction<PutLicenseRequest,
PutLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPutLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                   LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                   IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PutLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
              PutLicenseRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(PutLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }

    @Override
    protected void masterOperation(final PutLicenseRequest request, ClusterState state, final
ActionListener<PutLicenseResponse>
        listener) throws ElasticsearchException {

```

```

        licenseService.registerLicense(request, listener);
    }

}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartBasicRequestBuilder extends ActionRequestBuilder<PostStartBasicRequest,
    PostStartBasicResponse, PostStartBasicRequestBuilder> {

    PostStartBasicRequestBuilder(ElasticsearchClient client, PostStartBasicAction action) {
        super(client, action, new PostStartBasicRequest());
    }

    public PostStartBasicRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetTrialStatusResponse extends ActionResponse {

    private boolean eligibleToStartTrial;

    GetTrialStatusResponse() {
    }

    GetTrialStatusResponse(boolean eligibleToStartTrial) {
        this.eligibleToStartTrial = eligibleToStartTrial;
    }
}

```

```

    }

    boolean isEligibleToStartTrial() {
        return eligibleToStartTrial;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        eligibleToStartTrial = in.readBoolean();
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        out.writeBoolean(eligibleToStartTrial);
    }
}
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicBoolean;
import java.util.concurrent.atomic.AtomicReference;

public class StartTrialClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This API initiates a free 30-day trial for all
    platinum features. " +
        "By starting this trial, you agree that it is subject to the terms and conditions at" +
        " https://www.elastic.co/legal/trial_license/. To begin your free trial, call /start_trial again and specify " +
        "the \"acknowledge=true\" parameter.";

```

```

private static final Map<String, String[]> ACK_MESSAGES = Collections.singletonMap("security",
    new String[] {"With a trial license, X-Pack security features are available, but are not enabled by default."});

private final Logger logger;
private final String clusterName;
private final PostStartTrialRequest request;
private final ActionListener<PostStartTrialResponse> listener;
private final Clock clock;

StartTrialClusterTask(Logger logger, String clusterName, Clock clock, PostStartTrialRequest request,
    ActionListener<PostStartTrialResponse> listener) {
    this.logger = logger;
    this.clusterName = clusterName;
    this.request = request;
    this.listener = listener;
    this.clock = clock;
}

@Override
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
    logger.debug("started self generated trial license: {}", oldLicensesMetaData);

    if (request.isAcknowledged() == false) {
        listener.onResponse(new
PostStartTrialResponse(PostStartTrialResponse.Status.NEED_ACKNOWLEDGEMENT,
            ACK_MESSAGES, ACKNOWLEDGEMENT_HEADER));
    } else if (oldLicensesMetaData == null || oldLicensesMetaData.isEligibleForTrial()) {
        listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.UPGRADED_TO_TRIAL));
    } else {
        listener.onResponse(new
PostStartTrialResponse(PostStartTrialResponse.Status.TRIAL_ALREADY_ACTIVATED));
    }
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData currentLicensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);

    if (request.isAcknowledged() == false) {
        return currentState;
    } else if (currentLicensesMetaData == null || currentLicensesMetaData.isEligibleForTrial()) {
        long issueDate = clock.millis();
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        long expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
    }
}

```

```

        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type(request.getType())
            .expiryDate(expiryDate);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense,
Version.CURRENT);
        mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
    listener.onFailure(e);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

    private boolean acknowledge = false;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartBasicRequest acknowledge(boolean acknowledge) {

```

```

        this.acknowledge = acknowledge;
        return this;
    }

    public boolean isAcknowledged() {
        return acknowledge;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        acknowledge = in.readBoolean();
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        out.writeBoolean(acknowledge);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetBasicStatusResponse extends ActionResponse {

    private boolean eligibleToStartBasic;

    GetBasicStatusResponse() {
    }

    GetBasicStatusResponse(boolean eligibleToStartBasic) {
        this.eligibleToStartBasic = eligibleToStartBasic;
    }

    boolean isEligibleToStartBasic() {
        return eligibleToStartBasic;
    }
}

```

```

@Override
public void readFrom(StreamInput in) throws IOException {
    eligibleToStartBasic = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    out.writeBoolean(eligibleToStartBasic);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.util.UUID;

abstract class ExpirationCallback {

    static final String EXPIRATION_JOB_PREFIX = ".license_expiration_job_";

    public enum Orientation {PRE, POST}

    /**
     * Callback that is triggered every <code>frequency</code> when
     * current time is between <code>max</code> and <code>min</code>
     * before license expiry.
     */
    public abstract static class Pre extends ExpirationCallback {

        /**
         * Callback schedule prior to license expiry
         *
         * @param min    latest relative time to execute before license expiry
         * @param max    earliest relative time to execute before license expiry
         * @param frequency interval between execution
         */
        Pre(TimeValue min, TimeValue max, TimeValue frequency) {
            super(Orientation.PRE, min, max, frequency);
        }
    }
}

```



```

/**
 * Callback that is triggered every <code>frequency</code> when
 * current time is between <code>min</code> and <code>max</code>
 * after license expiry.
 */
public abstract static class Post extends ExpirationCallback {

    /**
     * Callback schedule after license expiry
     *
     * @param min    earliest relative time to execute after license expiry
     * @param max    latest relative time to execute after license expiry
     * @param frequency interval between execution
     */
    Post(TimeValue min, TimeValue max, TimeValue frequency) {
        super(Orientation.POST, min, max, frequency);
    }
}

private final String id;
private final Orientation orientation;
private final long min;
private final long max;
private final long frequency;

private ExpirationCallback(Orientation orientation, TimeValue min, TimeValue max, TimeValue frequency) {
    this.orientation = orientation;
    this.min = (min == null) ? 0 : min.getMillis();
    this.max = (max == null) ? Long.MAX_VALUE : max.getMillis();
    this.frequency = frequency.getMillis();
    this.id = String.join("", EXPIRATION_JOB_PREFIX, UUID.randomUUID().toString());
}

public final String getId() {
    return id;
}

public final long getFrequency() {
    return frequency;
}

/**
 * Calculates the delay for the next trigger time. When <code>now</code> is in a
 * valid time bracket with respect to <code>expirationDate</code>, the delay is 0.
 * When <code>now</code> is before the time bracket, than delay to the start of the
 * time bracket and when <code>now</code> is passed the valid time bracket, the delay
 * is <code>null</code>
 * @param expirationDate license expiry date in milliseconds

```

```

* @param now current time in milliseconds
* @return time delay
*/
final TimeValue delay(long expirationDate, long now) {
    final TimeValue delay;
    switch (orientation) {
        case PRE:
            if (expirationDate >= now) {
                // license not yet expired
                long preExpiryDuration = expirationDate - now;
                if (preExpiryDuration > max) {
                    // license duration is longer than maximum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(preExpiryDuration - max);
                } else if (preExpiryDuration <= max && preExpiryDuration >= min) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            } else {
                // invalid after license expiry
                delay = null;
            }
            break;
        case POST:
            if (expirationDate >= now) {
                // license not yet expired, delay it to the first match time
                delay = TimeValue.timeValueMillis(expirationDate - now + min);
            } else {
                // license has expired
                long expiredDuration = now - expirationDate;
                if (expiredDuration < min) {
                    // license expiry duration is shorter than minimum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(min - expiredDuration);
                } else if (expiredDuration >= min && expiredDuration <= max) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            }
            break;
        default:
            throw new IllegalStateException("orientation [" + orientation + "] unknown");
    }
    return delay;
}

```

```

}

/**
 * {@link SchedulerEngine.Schedule#nextScheduledTimeAfter(long, long)} with respect to
 * license expiry date
 */
public final long nextScheduledTimeForExpiry(long expiryDate, long startTime, long time) {
    TimeValue delay = delay(expiryDate, time);
    if (delay != null) {
        long delayInMillis = delay.getMillis();
        if (delayInMillis == 0L) {
            if (startTime == time) {
                // initial trigger and in time bracket, schedule immediately
                return time;
            } else {
                // in time bracket, add frequency
                return time + frequency;
            }
        } else {
            // not in time bracket
            return time + delayInMillis;
        }
    }
    return -1;
}

/**
 * Code to execute when the expiry callback is triggered in a valid
 * time bracket
 * @param license license to operate on
 */
public abstract void on(License license);

public final String toString() {
    return LoggerMessageFormat.format(null, "ExpirationCallback:(orientation [{}], min [{}], max [{}], freq
[{}])",
        orientation.name(), TimeValue.timeValueMillis(min), TimeValue.timeValueMillis(max),
        TimeValue.timeValueMillis(frequency));
}
}
{
"metadata": {
"name": "X-Pack Monitoring: License Expiration",
"xpack": {
"link": "license",
"expires_days": [ 60, 30, 14, 7 ],
"severity": 0,
>alert_index": ".monitoring-alerts-6",

```

```

    "cluster_uuid": "${monitoring.watch.cluster_uuid}",
    "type": "monitoring",
    "version_created": 7000001,
    "watch": "${monitoring.watch.id}"
  }
},
"trigger": {
  "schedule": {
    "interval": "1m"
  }
},
"input": {
  "chain": {
    "inputs": [
      {
        "check": {
          "search": {
            "request": {
              "indices": [
                ".monitoring-es-*"
              ],
              "body": {
                "size": 1,
                "sort": [
                  {
                    "timestamp": {
                      "order": "desc"
                    }
                  }
                ]
              },
              "_source": [
                "license.*"
              ],
              "query": {
                "bool": {
                  "filter": [
                    {
                      "term": {
                        "cluster_uuid": "{{ctx.metadata.xpack.cluster_uuid}}"
                      }
                    },
                    {
                      "term": {
                        "type": "cluster_stats"
                      }
                    }
                  ],
                  "range": {

```

```

        "timestamp": {
          "gte": "now-2m"
        }
      }
    ]
  }
}
},
{
  "alert": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-alerts-6"
        ],
        "body": {
          "size": 1,
          "terminate_after": 1,
          "query": {
            "bool": {
              "filter": {
                "term": {
                  "_id": "{{ctx.watch_id}}"
                }
              }
            }
          },
          "sort": [
            { "timestamp": { "order": "desc" } }
          ]
        }
      }
    }
  }
},
{
  "kibana_settings": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-kibana-6-*"
        ],
        "body": {

```

```

        "size": 1,
        "query": {
          "bool": {
            "filter": {
              "term": {
                "type": "kibana_settings"
              }
            }
          }
        },
        "sort": [
          {
            "timestamp": {
              "order": "desc"
            }
          }
        ]
      }
    }
  }
}
]
},
"condition": {
  "script": {
    "source": "if (ctx.payload.check.hits.total == 0) {return false;}def license =
ctx.payload.check.hits.hits[0]._source.license;if (license == null) {return false;}ctx.vars.fails_check = false;Instant
expiry = Instant.ofEpochMilli(license.expiry_date_in_millis);ctx.vars.expiry = expiry;if (license.status != 'active')
{ctx.vars.expired = true;ctx.vars.fails_check = true;ctx.metadata.xpack.severity = 2001;} else {Instant now =
Instant.ofEpochMilli(new Date().getTime());ctx.vars.now = now;for (int i = ctx.metadata.xpack.expires_days.length
- 1;i > -1;--i) {if (license.type == 'trial' && i < 2) {break;}Instant fromNow =
now.plusSeconds(ctx.metadata.xpack.expires_days[i] * 24 * 60 * 60);if (fromNow.isAfter(expiry))
{ctx.vars.fails_check = true;ctx.metadata.xpack.severity = i * 1000;break;}} }ctx.vars.not_resolved =
(ctx.payload.alert.hits.total == 1 && ctx.payload.alert.hits.hits[0]._source.resolved_timestamp ==
null);ctx.vars.update = ctx.vars.fails_check || ctx.vars.not_resolved;"
  }
},
"transform": {
  "script": {
    "source": "ctx.vars.email_recipient = (ctx.payload.kibana_settings.hits.total > 0) ?
ctx.payload.kibana_settings.hits.hits[0]._source.kibana_settings.xpack.default_admin_email : null;ctx.vars.is_new =
ctx.vars.fails_check && !ctx.vars.not_resolved;ctx.vars.is_resolved = !ctx.vars.fails_check &&
ctx.vars.not_resolved;def alertMessage = null;if (ctx.vars.fails_check) { alertMessage = 'Update your license.';} if
(ctx.vars.not_resolved) { ctx.payload = ctx.payload.alert.hits.hits[0]._source;ctx.payload.metadata =
ctx.metadata.xpack;if (ctx.vars.fails_check == false) { ctx.payload.resolved_timestamp = ctx.execution_time;} }
else { ctx.payload = [ 'timestamp': ctx.execution_time, 'prefix': 'This cluster\\'s license is going to expire in

```

```

{{#relativeTime}}metadata.time{{/relativeTime}} at {{#absoluteTime}}metadata.time{{/absoluteTime}}.',
'message': alertMessage, 'metadata': ctx.metadata.xpack ]; if (ctx.vars.fails_check) { ctx.payload.metadata.time =
ctx.vars.expiry.toString();} ctx.payload.update_timestamp = ctx.execution_time;return ctx.payload;"
}
},
"actions": {
  "add_to_alerts_index": {
    "index": {
      "index": ".monitoring-alerts-6",
      "doc_type": "doc",
      "doc_id": "${monitoring.watch.unique_id}"
    }
  },
  "send_email_to_admin": {
    "condition": {
      "script": "return ctx.vars.email_recipient != null && (ctx.vars.is_new || ctx.vars.is_resolved)"
    },
    "email": {
      "to": "X-Pack Admin <{{ctx.vars.email_recipient}}>",
      "from": "X-Pack Admin <{{ctx.vars.email_recipient}}>",
      "subject":
"[[{{#ctx.vars.is_new}}NEW{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}RESOLVED{{/ctx.vars.is_resolved}}]
[{{ctx.metadata.name}}]",
      "body": {
        "text": "[{{#ctx.vars.is_resolved}}This cluster alert has been resolved: {{/ctx.vars.is_resolved}} This cluster's
license [{{#ctx.vars.is_new}}]is going to expire on
[{{ctx.payload.metadata.time}}]{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}was going to
expire[{{ctx.payload.metadata.time}}]{{/ctx.vars.is_resolved}}.
[{{#ctx.vars.is_new}}]{{ctx.payload.message}}]{{/ctx.vars.is_new}}]"
      }
    }
  }
}
}
}
}
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```
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.ml.action.CloseJobAction;
import org.elasticsearch.xpack.core.ml.action.DeleteDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.DeleteJobAction;
import org.elasticsearch.xpack.core.ml.action.GetDatafeedsStatsAction;
import org.elasticsearch.xpack.core.ml.action.GetJobsStatsAction;
import org.elasticsearch.xpack.core.ml.action.OpenJobAction;
import org.elasticsearch.xpack.core.ml.action.PutDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.PutJobAction;
import org.elasticsearch.xpack.core.ml.action.StartDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.StopDatafeedAction;
import org.elasticsearch.xpack.core.ml.client.MachineLearningClient;
import org.elasticsearch.xpack.core.ml.datafeed.DatafeedState;
import org.elasticsearch.xpack.core.ml.job.config.JobState;
import org.elasticsearch.persistent.PersistentTasksCustomMetaData;
import org.elasticsearch.xpack.ml.LocalStateMachineLearning;
import org.elasticsearch.xpack.ml.support.BaseMlIntegTestCase;
import org.junit.Before;

import java.util.Collections;

import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;

@TestLogging("org.elasticsearch.xpack.ml.action:DEBUG")
public class MachineLearningLicensingTests extends BaseMlIntegTestCase {

    @Before
    public void resetLicensing() {
        enableLicensing();
    }
}
```

```

ensureStableCluster(1);
ensureYellow();
}

public void testMachineLearningPutJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningputjobactionrestricted";
    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        listener.actionGet();
        fail("put job action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
            hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        PutJobAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testMachineLearningOpenJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningopenjobactionrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());

```

```

    });
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response response = putJobListener.actionGet();
    assertNotNull(response);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);
// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
    listener.actionGet();
    fail("open job action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);

// now that the license is invalid, the job should get closed:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
});

// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
    OpenJobAction.Response response = listener.actionGet();
    assertNotNull(response);
}
}

```

```

public void testMachineLearningPutDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningputdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
        listener.actionGet();
        fail("put datafeed action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);

```

```

        PutDatafeedAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testAutoCloseJobWithDatafeed() throws Exception {
    String jobId = "testautoclosejobwithdatafeed";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        ContentType.JSON).get();
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        // put job
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        // put datafeed
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        // open job
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
        // start datafeed
        PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
        listener.actionGet();
    }

    if (randomBoolean()) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        disableLicensing();
    }
    assertMLAllowed(false);

    // now that the license is invalid, the job should be closed and datafeed stopped:

```



```

assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

enableLicensing(randomValidLicenseType());
assertMLAllowed(true);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
    // open job
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
    // start datafeed
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
}

assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.OPENED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STARTED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(2, tasks.taskMap().size());
});

if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {
    disableLicensing();
}
assertMLAllowed(false);

```

```

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});
}

public void testMachineLearningStartDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningstartdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
        ());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
}

```

```

// now that the license is invalid, the job should get closed:
assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
    fail("start datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);
// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    // re-open job now that the license is valid again
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);

    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    StartDatafeedAction.Response response = listener.actionGet();
    assertNotNull(response);
}
}

public void testMachineLearningStopDatafeedActionNotRestricted() throws Exception {

```

```

String jobId = "testmachinelearningstopdatafeedactionnotrestricted";
String datafeedId = jobId + "-datafeed";
assertMLAllowed(true);
String datafeedIndex = jobId + "-data";
prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\\"properties\":{\\"time\":{\\"type\":\\"date\\\"}}}}",
    XContentType.JSON).get();
// test that license restricted apis do now work
Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
    PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
            Collections.singletonList(datafeedIndex))), putDatafeedListener);
    PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
    assertNotNull(putDatafeedResponse);
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
    PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(
        new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
    StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
    assertNotNull(startDatafeedResponse);
}

boolean invalidLicense = randomBoolean();
if (invalidLicense) {
    enableLicensing(randomInvalidLicenseType());
} else {
    enableLicensing(randomValidLicenseType());
}

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<StopDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).stopDatafeed(new StopDatafeedAction.Request(datafeedId), listener);
    if (invalidLicense) {
        // the stop datafeed due to invalid license happens async, so check if the datafeed turns into stopped state:
        assertBusy(() -> {
            GetDatafeedsStatsAction.Response response =

```

```

        new MachineLearningClient(client)
            .getDatafeedsStats(new GetDatafeedsStatsAction.Request(datafeedId)).actionGet();
        assertEquals(DatafeedState.STOPPED, response.getResponse().results().get(0).getDatafeedState());
    });
} else {
    listener.actionGet();
}

if (invalidLicense) {
    // the close due to invalid license happens async, so check if the job turns into closed state:
    assertBusy(() -> {
        GetJobsStatsAction.Response response =
            new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
        assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
    });
}
}

public void testMachineLearningCloseJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }

    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        enableLicensing(randomValidLicenseType());
    }

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    }
}

```

```

PlainActionFuture<CloseJobAction.Response> listener = PlainActionFuture.newFuture();
CloseJobAction.Request request = new CloseJobAction.Request(jobId);
request.setCloseTimeout(TimeValue.timeValueSeconds(20));
if (invalidLicense) {
    // the close due to invalid license happens async, so check if the job turns into closed state:
    assertBusy(() -> {
        GetJobsStatsAction.Response response =
            new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
        assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
    });
} else {
    new MachineLearningClient(client).closeJob(request, listener);
    listener.actionGet();
}
}
}

public void testMachineLearningDeleteJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }

    // Pick a random license
    License.OperationMode mode = randomLicenseType();
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).deleteJob(new DeleteJobAction.Request(jobId), listener);
        listener.actionGet();
    }
}

public void testMachineLearningDeleteDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningdeletedatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";

```

```

assertMLAllowed(true);
// test that license restricted apis do now work
Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response putJobResponse = putJobListener.actionGet();
    assertNotNull(putJobResponse);
    PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putDatafeed(
        new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
            Collections.singletonList(jobId))), putDatafeedListener);
    PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
    assertNotNull(putDatafeedResponse);
}

// Pick a random license
License.OperationMode mode = randomLicenseType();
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<DeleteDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).deleteDatafeed(new DeleteDatafeedAction.Request(datafeedId,
listener);
    listener.actionGet();
}

private static OperationMode randomInvalidLicenseType() {
    return randomFrom(License.OperationMode.GOLD, License.OperationMode.STANDARD,
License.OperationMode.BASIC);
}

private static OperationMode randomValidLicenseType() {
    return randomFrom(License.OperationMode.TRIAL, License.OperationMode.PLATINUM);
}

private static OperationMode randomLicenseType() {
    return randomFrom(License.OperationMode.values());
}

private static void assertMLAllowed(boolean expected) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        assertEquals(licenseState.isMachineLearningAllowed(), expected);
    }
}

```

```
    }
}

public static void disableLicensing() {
    disableLicensing(randomValidLicenseType());
}

public static void disableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, false);
    }
}

public static void enableLicensing() {
    enableLicensing(randomValidLicenseType());
}

public static void enableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, true);
    }
}
}
}
}

---
teardown:
- do:
    xpack.license.post:
        acknowledge: true
        body: |
            {"licenses":[{"uid":"3aa62ffe-36e1-4fad-bfdc-
9dff8301eb22","type":"trial","issue_date_in_millis":1523456691721,"expiry_date_in_millis":1838816691721,"max
_nodes":5,"issued_to":"customer","issuer":"elasticsearch","signature":"AAAABAAAAA2kWNcuc+DT0lrImYZKA
AAIAo5/x6hrsGh1GqqrJmy4qgmEC7gK0U4zQ6q5ZEMhm4jAAABAEn6fG9y2VxKBu2T3D5hffh56kzOQOD
COdhr0y2d17ZSIJMZRqO7ZywPCWNS1aR33GhfIHkTER0ysML0xMH/gXavhyRvMBndJj0UBKzuwpTawSlnx
YtcqN8mSBIvJC7Ki+uJ1SpAILC2ZP9fnkRlqwXqBITwfYn7xnZgu9DKrOWru/ipTPObo7jceP18VTK6nWFen7/h
CFDQTUFZ0jQvd+nq7A1PAcHGNxGfdbMVmAXCXgGWkrfT3clo9/vadgo+isNyh1sPq9mN7gwsvBAKtA1Frp
H2EXYYbfOsSpBvUmhYMgErLg1k3/CbS0pCWLKOaX1xTMayosdZOjagU3auZXY=","start_date_in_millis":-
1}}]}

---
"Installing and getting license works":

## current license version
- do:
    xpack.license.post:
        acknowledge: true
        body: |
            {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
8o2e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
```



```
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWh0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRfK4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQrN3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQ
c3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQBzhvozA0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXC18kX1SrgoFn1bXq61IvJwfw5qnmYNiH3hRhTO9EyaCBqaLk8
NXZQ6TrRkQSpEnnBwAYUkZeKXsuBoOk4B4mzwc/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWKbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"}}}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
## a license object has 11 attributes
```

```
- length: { license: 11 }
```

```
## bwc for licenses format
```

```
- do:
```

```
  xpack.license.post:
```

```
    acknowledge: true
```

```
    body: |
```

```
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"ma
x_nodes":1,"issued_to":"issued_to","issuer":"issuer","signature":"AAAAAwAAAA2T3vqdBBetKQaBgxipAAAB
mC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2M
XMvRfK4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS09
5MXRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQrN3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEph
ZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOE
hQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2V
E1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzS
GtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB7pG
FYgawfLm9zzT80LvcLHjy1t/v2uSzCQWKdXXhrwSy4WrAH2uK/+PEiQ7aEpW5erLsyJ5KLA6OEZJDaP7r+mj
OPuLt0++I5j4DMn7ybMzOPHXWbc6LETE3+pp0GZPyOmwsDkZSRUegTtciR2R6z+mdnGrhOYM80y08KVW
whdU/DHw41MK7ePo6tq73Nz49y9IDgt9fxA0t4ggEBPbnTDDbVQ25AjauY8sa0M5eg9rDDRayw1KamYWrara8
PIGX+2YjhtUeQhmlCPdlxc9wECJ7/knPss5bI3ZoXQR3fyXhjcXNnHEIsblqLrMCa13pLxs7II+KPYMa2ZYL/am4
P"}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
## license version: 1.x
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"subscription","subscription_type":"gold","issue_date_in_millis":1411948800000,"feature":"
shield","expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature
":"AAAAAQAAAA0LVAYwWpSH94cyXr4zAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVo
MVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0pp
THBkWKprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeG
wxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNi
WktNWGM5TUUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K
055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9w
TTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2
bDRWUzh6UG5pdENGWFRreXNKNkeE9PQAAAQA4qssc/URRZVdFoLwgy9dqybYEQLW8YLkiAyPV5XHHH
dtk+dtZiEpiNEDkUXhSX2waVJlsNRF8/4kqplDfwNoD2TUM8ftgiIfiSiZYGDTGST+yW/5eAveEU5J5v1liBN27b
wkqL+V4YAa0Tcm7NKKwjScWKAHiTU3vF8chPkGfCHE0kQgVwPC9RE82pTw0s6/uR4PflGNFfqPM0uiE5n
ucfVrtj89JQio/KA/7ZyFbo7VTNXxZQt7T7rZWBCP9KIjptXzcWuk08Q5S+rSoJNYbFo3HGKtrCVsRz/55rceNtd
wKKXu1IwnSeir4I1/KLduQTtFLy0+1th87VS8T88UT" ]}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
## multiple licenses version: 1.x
```

```
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"internal","subscription_type":"none","issue_date_in_millis":1411948800000,"feature":"shiel
d","expiry_date_in_millis":1440892799999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"A
AAAAQAAAA04Q4ky3rFyyWLFkytEAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZw
UzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkW
kprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0
MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNW
GM5TUUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28z
SmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJEND
VvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUz
h6UG5pdENGWFRreXNKNkeE9PQAAAQBxMvUMn4h2E4R4TQMijahTxQj4LPQO4f1M79UxX/XkDIGcH+J5p
RHx08OtTRPsFL1IED+h+PIXx307Vo+PNDsOxrVwoYZeYBkOLAO3ny9vhQga+52jYhMxIuFrT9xbcSCSNpMh
GogjOIPU2WgiopVdVcimo1+Gk8VtkIPB1wPwFzfOjOnPgp/Icx3WYpfkeAUUOyWUYiFIBAE4bnz84iF+xwLKb
gYk6aHF25ECBtdb/Uruhcm9+jEFpoIEUtCouvvk9C+NJZ4OickV4xpRgaRG2x9PONH8ZN0QGHgYhJGbisocXu
```

```
DmlLsyVxqxfMu3n/r7/jdsEJScjAlSrsLDOu6H"}, {"uid": "893361dc-9749-4997-93cb-802e3dofh7aa", "type": "internal", "subscription_type": "none", "issue_date_in_millis": 1443484800000, "feature": "watcher", "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAQAAAA0Sc90guRIaQEmgLvMnAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVklPSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1lIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6ldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQCQ94dju0pnDZR3Uuypi0ic3aQJ+nvVqe+U8u79Dga5n1qIjcHDh7HvIBJEkF+tnVPlo/PXV/x7BZSwVY1PVERit+6rYix1yuHEgqwxmx/VdRICjCaZM6tk0Ob4dZCPv6Ebn2Mmk89KHC/PwiLPqF6QfwV/Pkpa8k2A3ORJmvYSDvXhe6tCs8dq4ebrsFxqrZjwWh5CZSpzqqZBFXIngDv2N0hHhpGlueRszD0JJ5dfEL5ZA1DDOrgO9OJVeJSHyRqe1L5QRUNdXPvfS+EAG0Dd1cNdJ/sMpYCPnVjBw6iq2/YgM3cuztsXVB7Y7ij4WnoP3ce7Zjs9TwHn+IqzftC6"}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
- match: { license.uid: "893361dc-9749-4997-93cb-802e3dofh7aa" }
```

```
---
```

```
"Should throw 404 after license deletion":
```

```
- do:
```

```
  xpack.license.delete: { }
```

```
- match: { acknowledged: true }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
  catch: missing
```

```
---
```

```
"Should install a feature type license":
```

```
  # VERSION_NO_FEATURE_TYPE license version
```

```
- do:
```

```
  xpack.license.post:
```

```
    acknowledge: true
```

```
    body: |
```

```
      {"license": {"uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "gold", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issued_to", "issuer": "issuer", "signature": "AAAAAgAAAA3U8+YmnmvC+Cwsv/mRAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVklPSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1lIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZ
```

```
EphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pS
OEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3
o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbm
MzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB
e8GfzDm6T537Iuuvjetb3xK5dvg0K5NQapv+rczWcQFxcGuzbF8plkgetP1aAGZP4uRESQPMIOCsx4d0UqqAm
9f7GbBQ3193P+PogInPFfeEH9NvOmaAQovmxVM9SE6DsDqLX4cXSO+bgWpXPTd2LmpoQc1fXd6BZ8GeuyYp
VHVkP9hVU0tAYjw6HzYOE7+zuO1oJYOxElqy66AnIfkvHrvni+flym3tE7tDTgsDRaz7W3iBhaqiSntEqabEkvH
dPHQdSR99XGaEvnHO1paK01/35iZF6OXHsF7CCj+558GRXiVxzueOe7TsGSSt8g7YjZwV9bRCyU7oB4B/nidg
I"}}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
---
```

```
"Cannot start basic":
```

```
- do:
```

```
  catch: bad_request
```

```
  xpack.license.post:
```

```
    acknowledge: true
```

```
    body: |
```

```
      {"license":{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"basic","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"ma
x_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0IKPZ0a7aZquUltho/AAABmC
9ZN0hjZDBGYnVYRXPcOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVkl1PSmKxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGn1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQRn3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwNpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQ
c3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQAALuQ44
S3IG6SzolcXVJ6Z4CIXORDrYQ+wdLCeey0XdujTslAOj+k+vNgo6wauc7Uswi01esHu4lb5IgpvKy7RRCbh5bj/z2
ubu2qMJqopp9BQyD7VQjVfqmG6seUMJwJ1a5Avvm9r41YPSPrCii3bKK2e1l6jK6N8ibCvnTyY/XkYGCJrBWT
SJePDbg6ErbyodrZ37x1StLbPWcNAkmweyHjDJnvYnbeZZO7A3NmubXZjW7Ttf8/YwQyE00PqMcl7fVPY3hk
KpAeHf8aaJbqkKYbqZuER3EWJX7ZvLvb1dNdNg8aXRn7YrkQcYwWgptYQpfV+D7yEJ4j5muAEoler"}}
```

```
- match: { error.root_cause.0.reason: 'Installing basic licenses is no longer allowed. Use the POST
/_xpack/license/start_basic API to install a basic license that does not expire.' }
```

```
---
```

```
"Should fail gracefully when body content is not provided":
```

```
- do:
```

```
  catch: bad_request
```

```
  xpack.license.post:
```

```
    acknowledge: true
```

- match: { error.root_cause.0.reason: 'The license must be provided in the request body' }

"Current license is trial means not eligible to start trial":

- do:

 xpack.license.get_trial_status: { }

- match: { eligible_to_start_trial: false }

- do:

 xpack.license.post_start_basic:
 acknowledge: true

- match: { basic_was_started: true }

- do:

 xpack.license.get_trial_status: { }

- match: { eligible_to_start_trial: false }

- do:

 catch: forbidden
 xpack.license.post_start_trial:
 acknowledge: true

- match: { trial_was_started: false }

- match: { error_message: "Operation failed: Trial was already activated." }

"Trial license cannot be basic":

- do:

 catch: bad_request
 xpack.license.post_start_trial:
 type: "basic"
 acknowledge: true

"Can start basic license if do not already have basic":

- do:

 xpack.license.get_basic_status: { }

- match: { eligible_to_start_basic: true }

- do:

 xpack.license.post_start_basic:
 acknowledge: true

- match: { basic_was_started: true }

- match: { acknowledged: true }

```

- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: false }

- do:
  catch: forbidden
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: true }
- match: { error_message: "Operation failed: Current license is basic." }
---
"Must acknowledge to start basic":
- do:
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: false }
- match: { error_message: "Operation failed: Needs acknowledgement." }
{
"xpack.license.delete": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["DELETE"],
  "url": {
    "path": "/_xpack/license",
    "paths": ["/_xpack/license"],
    "parts": {}
  },
  "body": null
}
}
{
"xpack.license.get": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["GET"],
  "url": {
    "path": "/_xpack/license",
    "paths": ["/_xpack/license"],
    "parts": {
    },
    "params": {
      "local": {
        "type": "boolean",
        "description": "Return local information, do not retrieve the state from master node (default: false)"
      }
    }
  }
}
}

```

```

    },
    "body": null
  }
}
{
  "xpack.license.post_start_basic": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["POST"],
    "url": {
      "path": "/_xpack/license/start_basic",
      "paths": ["/_xpack/license/start_basic"],
      "parts": {
      },
      "params": {
        "acknowledge": {
          "type": "boolean",
          "description": "whether the user has acknowledged acknowledge messages (default: false)"
        }
      }
    },
    "body": null
  }
}
{
  "xpack.license.get_trial_status": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["GET"],
    "url": {
      "path": "/_xpack/license/trial_status",
      "paths": ["/_xpack/license/trial_status"],
      "parts": {
      },
      "params": {
      }
    },
    "body": null
  }
}
{
  "xpack.license.post": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["PUT", "POST"],
    "url": {
      "path": "/_xpack/license",
      "paths": ["/_xpack/license"],
      "parts": {
      },
      "params": {
      }
    }
  }
}

```

```

    "acknowledge": {
      "type": "boolean",
      "description": "whether the user has acknowledged acknowledge messages (default: false)"
    }
  },
  "body": {
    "description": "licenses to be installed"
  }
}
{
  "xpack.license.post_start_trial": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["POST"],
    "url": {
      "path": "/_xpack/license/start_trial",
      "paths": ["/_xpack/license/start_trial"],
      "parts": {
      },
      "params": {
        "type": {
          "type": "string",
          "description": "The type of trial license to generate (default: \"trial\")"
        },
        "acknowledge": {
          "type": "boolean",
          "description": "whether the user has acknowledged acknowledge messages (default: false)"
        }
      }
    },
    "body": null
  }
}
{
  "xpack.license.get_basic_status": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["GET"],
    "url": {
      "path": "/_xpack/license/basic_status",
      "paths": ["/_xpack/license/basic_status"],
      "parts": {
      },
      "params": {
      }
    },
    "body": null
  }
}

```


}

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<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

```
<link rel="dns-prefetch" href="https://assets-cdn.github.com">
<link rel="dns-prefetch" href="https://avatars0.githubusercontent.com">
<link rel="dns-prefetch" href="https://avatars1.githubusercontent.com">
<link rel="dns-prefetch" href="https://avatars2.githubusercontent.com">
<link rel="dns-prefetch" href="https://avatars3.githubusercontent.com">
<link rel="dns-prefetch" href="https://github-cloud.s3.amazonaws.com">
<link rel="dns-prefetch" href="https://user-images.githubusercontent.com/">

<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/frameworks-
2d2d4c150f7000385741c6b992b302689ecd172246c6428904e0813be9bceca6.css" media="all" rel="stylesheet" />
<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/github-
0522ae8d3b3bdc841d2f91f90efd5f1fd9040d910905674cd134ced43a6dfea6.css" media="all" rel="stylesheet" />

<link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/site-
cfab053e93f0e27f4c63d4ff6b7957bd25f711667fe678e747f8a4d88c47b38d.css" media="all" rel="stylesheet" />

<meta name="viewport" content="width=device-width">

<title>cryptacular/NOTICE at master · vt-middleware/cryptacular · GitHub</title>
<link rel="search" type="application/opensearchdescription+xml" href="/opensearch.xml" title="GitHub">
<link rel="fluid-icon" href="https://github.com/fluidicon.png" title="GitHub">
<meta property="fb:app_id" content="1401488693436528">

<meta content="https://avatars7.githubusercontent.com/u/6122907?v=4&s=400" property="og:image" /><meta
content="GitHub" property="og:site_name" /><meta content="object" property="og:type" /><meta content="vt-
middleware/cryptacular" property="og:title" /><meta content="https://github.com/vt-middleware/cryptacular"
property="og:url" /><meta content="cryptacular - The friendly complement to the BouncyCastle crypto API for
Java." property="og:description" />

<link rel="assets" href="https://assets-cdn.github.com/">

<meta name="pjax-timeout" content="1000">

<meta name="request-id" content="E0E4:26F16:12A5AE6:1D11801:596C7978" data-pjax-transient>

<meta name="selected-link" value="repo_source" data-pjax-transient>

<meta name="google-site-verification" content="KT5gs8h0wvaagLKA VWq8bbeNwnZZK1r1XQysX3xurLU">
<meta name="google-site-verification" content="ZzhVyeFwb7w3e0-uOTlm8Jsck2F5StVihD0exw2fsA">
<meta name="google-analytics" content="UA-3769691-2">

<meta content="collector.githubapp.com" name="octolytics-host" /><meta content="github" name="octolytics-app-
```

```
id" /><meta content="https://collector.githubapp.com/github-external/browser_event" name="octolytics-event-url" /><meta content="E0E4:26F16:12A5AE6:1D11801:596C7978" name="octolytics-dimension-request_id" /><meta content="sea" name="octolytics-dimension-region_edge" /><meta content="iad" name="octolytics-dimension-region_render" /><meta content="/<user-name>/<repo-name>/blob/show" data-pjax-transient="true" name="analytics-location" />
```

```
<meta class="js-ga-set" name="dimension1" content="Logged Out">
```

```
<meta name="hostname" content="github.com">
```

```
<meta name="user-login" content="">
```

```
<meta name="expected-hostname" content="github.com">
```

```
<meta name="js-proxy-site-detection-payload"
```

```
content="N2ZhMjk0NTA4MjI1NmZhYTVINzM5NzVjZmFkOWY2NGFkNmMxYzcyMGViNzAzZGQxMGMzZmJhZDQ3YWZiZTI0OHx7InJlbW90ZV9hZGRyZXNzIjoiMTEwLjIwLjIyMC4xMzUjLCJyZXF1ZXN0X2lkIjoiRTBFNDoyNkYxNjoxMkE1QUU2OjFEMTE4MDE6NTk2Qzc5NzgiLCJ0aW1lc3RhbXAiOiE1MDAyODEyMDgsImhvc3QiOiIjInaXRodWIuY29tIn0=">
```

```
<meta name="html-safe-nonce" content="5aa226b80a18dc40894e1d405e4eb31cfca7d616">
```

```
<meta http-equiv="x-pjax-version" content="f682644ce1bb9629b9d9d9bedf64801b">
```

```
<link href="https://github.com/vt-middlewares/cryptacular/commits/master.atom" rel="alternate" title="Recent Commits to cryptacular:master" type="application/atom+xml">
```

```
<meta name="description" content="cryptacular - The friendly complement to the BouncyCastle crypto API for Java.">
```

```
<meta name="go-import" content="github.com/vt-middlewares/cryptacular git https://github.com/vt-middlewares/cryptacular.git">
```

```
<meta content="6122907" name="octolytics-dimension-user_id" /><meta content="vt-middlewares" name="octolytics-dimension-user_login" /><meta content="15714989" name="octolytics-dimension-repository_id" /><meta content="vt-middlewares/cryptacular" name="octolytics-dimension-repository_nwo" /><meta content="true" name="octolytics-dimension-repository_public" /><meta content="false" name="octolytics-dimension-repository_is_fork" /><meta content="15714989" name="octolytics-dimension-repository_network_root_id" /><meta content="vt-middlewares/cryptacular" name="octolytics-dimension-repository_network_root_nwo" /><meta content="false" name="octolytics-dimension-repository_explore_github_marketplace_ci_cta_shown" />
```

```

<link rel="canonical" href="https://github.com/vt-middlewre/cryptacular/blob/master/NOTICE" data-pjax-
transient>

<meta name="browser-stats-url" content="https://api.github.com/_private/browser/stats">

<meta name="browser-errors-url" content="https://api.github.com/_private/browser/errors">

<link rel="mask-icon" href="https://assets-cdn.github.com/pinned-octocat.svg" color="#000000">
<link rel="icon" type="image/x-icon" href="https://assets-cdn.github.com/favicon.ico">

<meta name="theme-color" content="#1e2327">

</head>

<body class="logged-out env-production page-blob">

<div class="position-relative js-header-wrapper ">
  <a href="#start-of-content" tabindex="1" class="px-2 py-4 show-on-focus js-skip-to-content">Skip to content</a>
  <div id="js-pjax-loader-bar" class="pjax-loader-bar"><div class="progress"></div></div>

  <header class="site-header js-details-container Details" role="banner">
    <div class="site-nav-container">
      <a class="header-logo-invertocat" href="https://github.com/" aria-label="Homepage" data-ga-click="(Logged out)
Header, go to homepage, icon:logo-wordmark">
        <svg aria-hidden="true" class="octicon octicon-mark-github" height="32" version="1.1" viewBox="0 0 16 16"
width="32"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59.47.55 1.17 1.08 1.92
.19-.01-.82-.01-1.49-.2.01-.37-.25-.49-.26-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53.63-.01 1.08.58
1.23.82.72 1.21 1.87.87 2.33.66.07-.52.28-.87.51-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87.31-1.59.82-2.15-.08-.2-.36-
1.02.08-2.12 0 0 .67-.21 2.28-.64-.18 1.32-.27 2-.27.68 0 1.36.09 2 .27 1.53-1.04 2.2-.82 2.2-.82.44 1.1.16 1.92.08
2.12.51.56.82 1.27.82 2.15 0 3.07-1.87 3.75-3.65 3.95.29.25.54.73.54 1.48 0 1.07-.01 1.93-.01 2.2 0
.21.15.46.55.38.82.01 8.013 8.013 0 0 16 8c0-4.42-3.58-8-8z"/></svg>
      </a>

      <button class="btn-link float-right site-header-toggle js-details-target" type="button" aria-label="Toggle
navigation" aria-expanded="false">
        <svg aria-hidden="true" class="octicon octicon-three-bars" height="24" version="1.1" viewBox="0 0 12 16"

```

```

width="18"><path fill-rule="evenodd" d="M11.41 9H.59C0 9 0 8.59 0 8c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0
.59 0 1-.59 1h.01zm0-4H.59C0 5 0 4.59 0 4c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1h.01zM.59
11H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1H.59C0 13 0 12.59 0 12c0-.59 0-1 .59-1z"/></svg>
</button>

<div class="site-header-menu">
  <nav class="site-header-nav">
    <a href="/features" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:features" data-selected-links="/features /features/code-review /features/project-management
/features/integrations /features">
      Features
    </a>
    <a href="/business" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:business" data-selected-links="/business /business/security /business/customers /business">
      Business
    </a>
    <a href="/explore" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:explore" data-selected-links="/explore /trending /trending/developers /stars /integrations
/integrations/feature/code /integrations/feature/collaborate /integrations/feature/ship showcases showcases_search
showcases_landing /explore">
      Explore
    </a>
    <a href="/marketplace" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav
menu - item:marketplace" data-selected-links=" /marketplace">
      Marketplace
    </a>
    <a href="/pricing" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:pricing" data-selected-links="/pricing /pricing/developer /pricing/team /pricing/business-hosted
/pricing/business-enterprise /pricing">
      Pricing
    </a>
  </nav>

  <div class="site-header-actions">
    <div class="header-search scoped-search site-scoped-search js-site-search" role="search">
      <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="/vt-
middleware/cryptacular/search" class="js-site-search-form" data-scoped-search-url="/vt-
middleware/cryptacular/search" data-unscoped-search-url="/search" method="get"><div
style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden" value="#x2713;" /></div>
      <label class="form-control header-search-wrapper js-chromeless-input-container">
        <a href="/vt-middleware/cryptacular/blob/master/NOTICE" class="header-search-scope no-underline">This
repository</a>
        <input type="text"
          class="form-control header-search-input js-site-search-focus js-site-search-field is-clearable"
          data-hotkey="s"
          name="q"
          value=""
          placeholder="Search"
          aria-label="Search this repository"
          data-unscoped-placeholder="Search GitHub"
          data-scoped-placeholder="Search"
          autocapitalize="off">
        <input type="hidden" class="js-site-search-type-field" name="type" >
    </div>
  </div>

```

```
</label>
</form></div>
```

```
    <a class="text-bold site-header-link" href="/login?return_to=%2Fvt-
middleware%2Fcryptacular%2Fblob%2Fmaster%2FNOTICE" data-ga-click="(Logged out) Header, clicked Sign
in, text:sign-in">Sign in</a>
    <span class="text-gray">or</span>
    <a class="text-bold site-header-link" href="/join?source=header-repo" data-ga-click="(Logged out) Header,
clicked Sign up, text:sign-up">Sign up</a>
  </div>
</div>
</div>
</header>
```

```
</div>
```

```
<div id="start-of-content" class="show-on-focus"></div>
```

```
<div id="js-flash-container">
</div>
```

```
<div role="main">
  <div itemscope itemtype="http://schema.org/SoftwareSourceCode">
    <div id="js-repo-pjax-container" data-pjax-container>
```

```
<div class="pagehead repohead instapaper_ignore readability-menu experiment-repo-nav">
```

```
<div class="container repohead-details-container">
```

```
<ul class="pagehead-actions">
```

```
<li>
```

```
<a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
class="btn btn-sm btn-with-count tooltipped tooltipped-n"
aria-label="You must be signed in to watch a repository" rel="nofollow">
<svg aria-hidden="true" class="octicon octicon-eye" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.06 2C3 2 0 8s3 6 8.06 6C13 14 16 8 16 8s-3-6-7.94-6zM8 12c-
2.2 0-4-1.78-4-4 0-2.2 1.8-4 4-4 2.2 0 4 1.8 4 4 0 2.2-1.78 4 4 4zm2-4c0 1.11-.89 2-2 2-1.11 0-2-.89-2-2 0-
1.11.89-2 2-2 1.11 0 2 .89 2 2z"/></svg>
```

```
Watch
```

```

</a>
<a class="social-count" href="/vt-middleware/cryptacular/watchers"
  aria-label="9 users are watching this repository">
  9
</a>

</li>

<li>
  <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
    class="btn btn-sm btn-with-count tooltiped tooltiped-n"
    aria-label="You must be signed in to star a repository" rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-star" height="16" version="1.1" viewBox="0 0 14 16"
      width="14"><path fill-rule="evenodd" d="M14 6l-4.9-.64L7 1 4.9 5.36 0 6l3.6 3.26L2.67 14 7 11.67 11.33 14l-.93-
      4.74z"/></svg>
    Star
  </a>

  <a class="social-count js-social-count" href="/vt-middleware/cryptacular/stargazers"
    aria-label="15 users starred this repository">
    15
  </a>

</li>

<li>
  <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
    class="btn btn-sm btn-with-count tooltiped tooltiped-n"
    aria-label="You must be signed in to fork a repository" rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-repo-forked" height="16" version="1.1" viewBox="0 0 10 16"
      width="10"><path fill-rule="evenodd" d="M8 1a1.993 1.993 0 0 0-1 3.72V6L5 8 3 6V4.72A1.993 1.993 0 0 0 2
      1a1.993 1.993 0 0 0-1 3.72V6.513 3v1.78A1.993 1.993 0 0 0 5 15a1.993 1.993 0 0 0 1-3.72V9.513-3V4.72A1.993
      1.993 0 0 0 8 1zM2 4.2C1.34 4.2.8 3.65.8 3c-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3 10c-
      .66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3-10c-.66 0-1.2-.55-1.2-1.2 0-
      .65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
    Fork
  </a>

  <a href="/vt-middleware/cryptacular/network" class="social-count"
    aria-label="1 user forked this repository">
    1
  </a>
</li>
</ul>

<h1 class="public ">
  <svg aria-hidden="true" class="octicon octicon-repo" height="16" version="1.1" viewBox="0 0 12 16"
    width="12"><path fill-rule="evenodd" d="M4 9H3V8h1v1zm0-3H3v1h1V6zm0-2H3v1h1V4zm0-

```

```

2H3v1h1V2zm8-1v12c0 .55-.45 1-1 1H6v2l-1.5-1.5L3 16v-2H1c-.55 0-1-.45-1-1V1c0-.55.45-1 1-1h10c.55 0 1 .45
1 1zm-1 10H1v2h2v-1h3v1h5v-2zm0-10H2v9h9V1z"/></svg>
<span class="author" itemprop="author"><a href="/vt-middleware" class="url fn" rel="author">vt-
middleware</a></span><!--
--><span class="path-divider"></span><!--
--><strong itemprop="name"><a href="/vt-middleware/cryptacular" data-pjax="#js-repo-pjax-
container">cryptacular</a></strong>

</h1>

</div>
<div class="container">

<nav class="reponav js-repo-nav js-sidenav-container-pjax"
  itemscope
  itemtype="http://schema.org/BreadcrumbList"
  role="navigation"
  data-pjax="#js-repo-pjax-container">

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular" class="js-selected-navigation-item selected reponav-item" data-hotkey="g
c" data-selected-links="repo_source repo_downloads repo_commits repo_releases repo_tags repo_branches /vt-
middleware/cryptacular" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-code" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M9.5 3L8 4.5 11.5 8 8 11.5 9.5 13 14 8 9.5 3zm-5 0L0 8l4.5 5L6 11.5
2.5 8 6 4.5 4.5 3z"/></svg>
    <span itemprop="name">Code</span>
    <meta itemprop="position" content="1">
  </a> </span>

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular/issues" class="js-selected-navigation-item reponav-item" data-hotkey="g i"
data-selected-links="repo_issues repo_labels repo_milestones /vt-middleware/cryptacular/issues" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-issue-opened" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M7 2.3c3.14 0 5.7 2.56 5.7 5.7s-2.56 5.7-5.7 5.7A5.71 5.71 0 0 1 1.3
8c0-3.14 2.56-5.7 5.7-5.7zm7 1C3.14 1 0 4.14 0 8s3.14 7 7 7-3.14 7-7-7zm1 3H6v5h2V4zm0
6H6v2h2v-2z"/></svg>
    <span itemprop="name">Issues</span>
    <span class="Counter">4</span>
    <meta itemprop="position" content="2">
  </a> </span>

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular/pulls" class="js-selected-navigation-item reponav-item" data-hotkey="g p"
data-selected-links="repo_pulls /vt-middleware/cryptacular/pulls" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-git-pull-request" height="16" version="1.1" viewBox="0 0 12
16" width="12"><path fill-rule="evenodd" d="M11 11.28V5c-.03-.78-.34-1.47-.94-2.06C9.46 2.35 8.78 2.03 8
2H7V0L4 3l3 3V4h1c.27.02.48.11.69.31.21.2.3.42.31.69v6.28A1.993 1.993 0 0 0 10 15a1.993 1.993 0 0 0 1-

```


3.72zm-1 2.92c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zM4 3c0-1.11-89-2-2-2a1.993 1.993 0 0 0-1 3.72v6.56A1.993 1.993 0 0 0 2 15a1.993 1.993 0 0 0 1-3.72V4.72c.59-.34 1-.98 1-1.72zm-.8 10c0 .66-.55 1.2-1.2 1.2-.65 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2zM2 4.2C1.34 4.2.8 3.65.8 3c0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>

Pull requests
1
<meta itemprop="position" content="3">

<svg aria-hidden="true" class="octicon octicon-project" height="16" version="1.1" viewBox="0 0 15 16" width="15"><path fill-rule="evenodd" d="M10 12h3V2h-3v10zm-4-2h3V2H6v8zm-4 4h3V2H2v12zm-1 1h13V1H1v14zM14 0H1a1 1 0 0-1 1v14a1 1 0 0 1 1h13a1 1 0 0 0 1-1V1a1 1 0 0 0-1-1z"/></svg>

Projects
0

<div class="reponav-dropdown js-menu-container">
<button type="button" class="btn-link reponav-item reponav-dropdown js-menu-target " data-no-toggle aria-expanded="false" aria-haspopup="true">

Insights
<svg aria-hidden="true" class="octicon octicon-triangle-down v-align-middle text-gray" height="11" version="1.1" viewBox="0 0 12 16" width="8"><path fill-rule="evenodd" d="M0 5l6 6z"/></svg>
</button>

<div class="dropdown-menu-content js-menu-content">
<div class="dropdown-menu dropdown-menu-sw">

<svg aria-hidden="true" class="octicon octicon-pulse" height="16" version="1.1" viewBox="0 0 14 16" width="14"><path fill-rule="evenodd" d="M11.5 8L8.8 5.4 6.6 8.5 5.5 1.6 2.38 8H0v2h3.6l9-1.8.9 5.4L9 8.5l1.6 1.5H14V8z"/></svg>

Pulse

<svg aria-hidden="true" class="octicon octicon-graph" height="16" version="1.1" viewBox="0 0 16 16" width="16"><path fill-rule="evenodd" d="M16 14v1H0V0h1v14h15zM5 13H3V8h2v5zm4 0H7V3h2v10zm4 0h-2V6h2v7z"/></svg>

Graphs

</div>
</div>
</div>
</nav>

</div>
</div>

```

<div class="container new-discussion-timeline experiment-repo-nav">
  <div class="repository-content">

    <a href="/vt-middleware/cryptacular/blob/c26911e3cd28497ce9daa3ce682e09cb2d1d8688/NOTICE" class="d-
    none js-permalink-shortcut" data-hotkey="y">Permalink</a>

    <!-- blob contrib key: blob_contributors:v21:f5054b9e46039e0ad937c69e6151b7d4 -->

    <div class="file-navigation js-zeroclipboard-container">

    <div class="select-menu branch-select-menu js-menu-container js-select-menu float-left">
    <button class=" btn btn-sm select-menu-button js-menu-target css-truncate" data-hotkey="w"

      type="button" aria-label="Switch branches or tags" aria-expanded="false" aria-haspopup="true">
        <i>Branch:</i>
        <span class="js-select-button css-truncate-target">master</span>
    </button>

    <div class="select-menu-modal-holder js-menu-content js-navigation-container" data-pjax>

    <div class="select-menu-modal">
    <div class="select-menu-header">
      <svg aria-label="Close" class="octicon octicon-x js-menu-close" height="16" role="img" version="1.1"
      viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M7.48 8l3.75-3.75-1.48-1.48L6 9.48l-3.75 3.75-
      1.48-1.48L4.52 8 .77 4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
      <span class="select-menu-title">Switch branches/tags</span>
    </div>

    <div class="select-menu-filters">
    <div class="select-menu-text-filter">
      <input type="text" aria-label="Filter branches/tags" id="context-commitish-filter-field" class="form-control
      js-filterable-field js-navigation-enable" placeholder="Filter branches/tags">
    </div>
    <div class="select-menu-tabs">
    <ul>
    <li class="select-menu-tab">
      <a href="#" data-tab-filter="branches" data-filter-placeholder="Filter branches/tags" class="js-select-menu-
      tab" role="tab">Branches</a>
    </li>
    <li class="select-menu-tab">
      <a href="#" data-tab-filter="tags" data-filter-placeholder="Find a tag" class="js-select-menu-tab"
      role="tab">Tags</a>
    </li>
    </ul>
    </div>
    </div>
  
```

```

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="branches"
role="menu">

  <div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/blob/ISSUE-31+32/NOTICE"
      data-name="ISSUE-31+32"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        ISSUE-31+32
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/blob/gh-pages/NOTICE"
      data-name="gh-pages"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        gh-pages
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open selected"
      href="/vt-middleware/cryptacular/blob/master/NOTICE"
      data-name="master"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        master
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/blob/v1.1/NOTICE"
      data-name="v1.1"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        v1.1
    </a>
  </div>

```

```

    </span>
  </a>
</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="tags">
  <div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/tree/v1.2.1/NOTICE"
      data-name="v1.2.1"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target" title="v1.2.1">
        v1.2.1
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/tree/v1.2.0/NOTICE"
      data-name="v1.2.0"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target" title="v1.2.0">
        v1.2.0
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/tree/v1.1.2/NOTICE"
      data-name="v1.1.2"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target" title="v1.1.2">
        v1.1.2
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/tree/v1.1.1/NOTICE"
      data-name="v1.1.1"
      data-skip-pjax="true"

```

```

rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.1.1">
    v1.1.1
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.0/NOTICE"
data-name="v1.1.0"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.1.0">
    v1.1.0
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.0/NOTICE"
data-name="v1.0"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0">
    v1.0
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.0-RC6/NOTICE"
data-name="v1.0-RC6"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC6">
    v1.0-RC6
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.0-RC4/NOTICE"
data-name="v1.0-RC4"
data-skip-pjax="true"
rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC4">

```

```

        v1.0-RC4
    </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC3/NOTICE"
  data-name="v1.0-RC3"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC3">
    v1.0-RC3
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC2/NOTICE"
  data-name="v1.0-RC2"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC2">
    v1.0-RC2
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC1/NOTICE"
  data-name="v1.0-RC1"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC1">
    v1.0-RC1
  </span>
</a>
</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

</div>
</div>
</div>

<div class="BtnGroup float-right">
  <a href="/vt-middleware/cryptacular/find/master"
    class="js-pjax-capture-input btn btn-sm BtnGroup-item"

```

```

    data-pjax
    data-hotkey="t">
    Find file
  </a>
  <button aria-label="Copy file path to clipboard" class="js-zeroclipboard btn btn-sm BtnGroup-item tooltiped
  tooltiped-s" data-copied-hint="Copied!" type="button">Copy path</button>
</div>
<div class="breadcrumb js-zeroclipboard-target">
  <span class="repo-root js-repo-root"><span class="js-path-segment"><a href="/vt-
  middleware/cryptacular"><span>cryptacular</span></a></span></span><span class="separator"></span><strong
  class="final-path">NOTICE</strong>
</div>
</div>

```

```

<div class="commit-tease">
  <span class="float-right">
    <a class="commit-tease-sha" href="/vt-
  middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1" data-pjax>
      6dd6f19
    </a>
    <relative-time datetime="2017-07-06T22:28:36Z">Jul 7, 2017</relative-time>
  </span>
  <div>
    
    <a href="/dfish3r" class="user-mention" rel="contributor">dfish3r</a>
    <a href="/vt-middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1"
  class="message" data-pjax="true" title="Update year in notice.">Update year in notice.</a>
  </div>

```

```

<div class="commit-tease-contributors">
  <button type="button" class="btn-link muted-link contributors-toggle" data-facebox="#blob_contributors_box">
    <strong>1</strong>
    contributor
  </button>
</div>

```

```

<div id="blob_contributors_box" style="display:none">
  <h2 class="facebox-header" data-facebox-id="facebox-header">Users who have contributed to this file</h2>
  <ul class="facebox-user-list" data-facebox-id="facebox-description">
    <li class="facebox-user-list-item">
      
      <a href="/dfish3r">dfish3r</a>
    </li>

```

```

    </ul>
  </div>
</div>

<div class="file">
  <div class="file-header">
  <div class="file-actions">

    <div class="BtnGroup">
      <a href="/vt-middleware/cryptacular/raw/master/NOTICE" class="btn btn-sm BtnGroup-item" id="raw-url">Raw</a>
      <a href="/vt-middleware/cryptacular/blame/master/NOTICE" class="btn btn-sm js-update-url-with-hash BtnGroup-item" data-hotkey="b">Blame</a>
      <a href="/vt-middleware/cryptacular/commits/master/NOTICE" class="btn btn-sm BtnGroup-item" rel="nofollow">History</a>
    </div>

    <button type="button" class="btn-octicon disabled tooltiped tooltiped-nw"
      aria-label="You must be signed in to make or propose changes">
      <svg aria-hidden="true" class="octicon octicon-pencil" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M0 12v3h3l8-8-3-3-8 8zm3 2H1v-2h1v1zm10.3-9.3L12 6 9 3l1.3-1.3a.996.996 0 0 1 1.41 0l1.59 1.59c.39.39 1.02 0 1.41z"/></svg>
    </button>
    <button type="button" class="btn-octicon btn-octicon-danger disabled tooltiped tooltiped-nw"
      aria-label="You must be signed in to make or propose changes">
      <svg aria-hidden="true" class="octicon octicon-trashcan" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M11 2H9c0-.55-.45-1-1-1H5c-.55 0-.45-1 1-1V3c0-.55-.45-1-1-1zm-1 12H3V5h1v8h1V5h1v8h1V5h1v8h1V5h1v9zm1-10H2V3h9v1z"/></svg>
    </button>
  </div>

  <div class="file-info">
    7 lines (5 sloc)
    <span class="file-info-divider"></span>
    165 Bytes
  </div>
</div>

<div itemprop="text" class="blob-wrapper data type-text">
  <table class="highlight tab-size js-file-line-container" data-tab-size="8">
  <tr>
    <td id="L1" class="blob-num js-line-number" data-line-number="1"></td>
    <td id="LC1" class="blob-code blob-code-inner js-file-line">Cryptacular Java Library</td>
  </tr>

```



```

<tr>
  <td id="L2" class="blob-num js-line-number" data-line-number="2"></td>
  <td id="LC2" class="blob-code blob-code-inner js-file-line">Copyright (C) 2003-2017 Virginia Tech.</td>
</tr>
<tr>
  <td id="L3" class="blob-num js-line-number" data-line-number="3"></td>
  <td id="LC3" class="blob-code blob-code-inner js-file-line">All rights reserved.</td>
</tr>
<tr>
  <td id="L4" class="blob-num js-line-number" data-line-number="4"></td>
  <td id="LC4" class="blob-code blob-code-inner js-file-line">
</td>
</tr>
<tr>
  <td id="L5" class="blob-num js-line-number" data-line-number="5"></td>
  <td id="LC5" class="blob-code blob-code-inner js-file-line">This product includes software developed at</td>
</tr>
<tr>
  <td id="L6" class="blob-num js-line-number" data-line-number="6"></td>
  <td id="LC6" class="blob-code blob-code-inner js-file-line">Virginia Tech (http://www.vt.edu).</td>
</tr>
</table>

</div>

</div>

<button type="button" data-facebox="#jump-to-line" data-facebox-class="linejump" data-hotkey="l" class="d-
none">Jump to Line</button>
<div id="jump-to-line" style="display:none">
  <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="" class="js-jump-
to-line-form" method="get"><div style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden"
value="&#x2713;" /></div>
  <input class="form-control linejump-input js-jump-to-line-field" type="text" placeholder="Jump to line&hellip;"
aria-label="Jump to line" autofocus>
  <button type="submit" class="btn">Go</button>
</form> </div>

</div>
<div class="modal-backdrop js-touch-events"></div>
</div>

</div>
</div>

</div>

```

```

<div class="container site-footer-container">
  <div class="site-footer " role="contentinfo">
    <ul class="site-footer-links float-right">
      <li><a href="https://github.com/contact" data-ga-click="Footer, go to contact, text:contact">Contact
GitHub</a></li>
      <li><a href="https://developer.github.com" data-ga-click="Footer, go to api, text:api">API</a></li>
      <li><a href="https://training.github.com" data-ga-click="Footer, go to training, text:training">Training</a></li>
      <li><a href="https://shop.github.com" data-ga-click="Footer, go to shop, text:shop">Shop</a></li>
      <li><a href="https://github.com/blog" data-ga-click="Footer, go to blog, text:blog">Blog</a></li>
      <li><a href="https://github.com/about" data-ga-click="Footer, go to about, text:about">About</a></li>
    </ul>

    <a href="https://github.com" aria-label="Homepage" class="site-footer-mark" title="GitHub">
      <svg aria-hidden="true" class="octicon octicon-mark-github" height="24" version="1.1" viewBox="0 0 16 16"
width="24"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59.4.07.55-.17.55-.38
0-.19-.01-.82-.01-1.49-2.01-.37-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53.63-.01
1.08.58 1.23.82.72 1.21 1.87.87 2.33.66.07-.52.28-.87.51-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87.31-1.59.82-2.15-.08-.2-.36-
1.02.08-2.12 0 0 .67-.21 2.28-.64-.18 1.32-.27 2-.27.68 0 1.36.09 2 .27 1.53-1.04 2.2-.82 2.2-.82.44 1.1.16 1.92.08
2.12.51.56.82 1.27.82 2.15 0 3.07-1.87 3.75-3.65 3.95.29.25.54.73.54 1.48 0 1.07-.01 1.93-.01 2.2 0
.21.15.46.55.38A8.013 8.013 0 0 0 16 8c0-4.42-3.58-8-8-8z"/></svg>
    </a>
    <ul class="site-footer-links">
      <li>&copy; 2017 <span title="0.10938s from unicorn-2925809464-f2ltq">GitHub</span>, Inc.</li>
      <li><a href="https://github.com/site/terms" data-ga-click="Footer, go to terms, text:terms">Terms</a></li>
      <li><a href="https://github.com/site/privacy" data-ga-click="Footer, go to privacy,
text:privacy">Privacy</a></li>
      <li><a href="https://github.com/security" data-ga-click="Footer, go to security,
text:security">Security</a></li>
      <li><a href="https://status.github.com/" data-ga-click="Footer, go to status, text:status">Status</a></li>
      <li><a href="https://help.github.com" data-ga-click="Footer, go to help, text:help">Help</a></li>
    </ul>
  </div>
</div>

```

```

<div id="ajax-error-message" class="ajax-error-message flash flash-error">
  <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-
.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-
2V6h2v4z"/></svg>
  <button type="button" class="flash-close js-flash-close js-ajax-error-dismiss" aria-label="Dismiss error">
    <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77
4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
  </button>

```

You can't perform that action at this time.

</div>

```
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/compat-91f98c37fc84eac24836eec2567e9912742094369a04c4eba6e3cd1fa18902d9.js"></script>
```

```
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/frameworks-f84bb87b149685d1e6c6f057ee324f2cd496e677f5a359a8b5db853313bb83e6.js"></script>
```

```
<script async="async" crossorigin="anonymous" src="https://assets-cdn.github.com/assets/github-13fa3aa50ac8f9fa9a7d198f0cd13b0905775d39446ad076d17d8f74a998438a.js"></script>
```

```
<div class="js-stale-session-flash stale-session-flash flash flash-warn flash-banner d-none">
```

```
<svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16" width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-.18.69 0 1.19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-2V6h2v4z"/></svg>
```

```
<span class="signed-in-tab-flash">You signed in with another tab or window. <a href="">Reload</a> to refresh your session.</span>
```

```
<span class="signed-out-tab-flash">You signed out in another tab or window. <a href="">Reload</a> to refresh your session.</span>
```

```
</div>
```

```
<div class="facebox" id="facebox" style="display:none;">
```

```
<div class="facebox-popup">
```

```
<div class="facebox-content" role="dialog" aria-labelledby="facebox-header" aria-describedby="facebox-description">
```

```
</div>
```

```
<button type="button" class="facebox-close js-facebox-close" aria-label="Close modal">
```

```
<svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8.77 4.25 11.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
```

```
</button>
```

```
</div>
```

```
</div>
```

```
</body>
```

```
</html>
```

```
/*
```

```
* Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
```

```
* or more contributor license agreements. Licensed under the Elastic License;
```

```
* you may not use this file except in compliance with the Elastic License.
```

```
*/
```

```
package org.elasticsearch.xpack.security.authz.permission;
```

```

import org.elasticsearch.action.get.GetAction;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.permission.Role;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import org.junit.Before;

import java.util.function.Predicate;

import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.MONITOR;
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.READ;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

public class PermissionTests extends ESTestCase {
    private Role permission;

    @Before
    public void init() {
        Role.Builder builder = Role.builder("test");
        builder.add(MONITOR, "test_*", "/foo.*/*");
        builder.add(READ, "baz_*foo", "/fool.*bar/*");
        builder.add(MONITOR, "/bar.*/*");
        permission = builder.build();
    }

    public void testAllowedIndicesMatcherAction() throws Exception {
        testAllowedIndicesMatcher(permission.indices().allowedIndicesMatcher(GetAction.NAME));
    }

    public void testAllowedIndicesMatcherActionCaching() throws Exception {
        Predicate<String> matcher1 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        Predicate<String> matcher2 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        assertThat(matcher1, is(matcher2));
    }

    public void testBuildEmptyRole() {
        Role.Builder permission = Role.builder(new String[] { "some_role" });
        Role role = permission.build();
        assertThat(role, notNullValue());
        assertThat(role.cluster(), notNullValue());
        assertThat(role.indices(), notNullValue());
        assertThat(role.runAs(), notNullValue());
    }

    public void testRunAs() {
        Role permission = Role.builder("some_role")
            .runAs(new Privilege("name", "user1", "run*"))
            .build();
    }
}

```

```

    assertThat(permission.runAs().check("user1"), is(true));
    assertThat(permission.runAs().check("user"), is(false));
    assertThat(permission.runAs().check("run" + randomAlphaOfLengthBetween(1, 10)), is(true));
}

// "baz_*foo", "/fool.*bar/"
private void testAllowedIndicesMatcher(Predicate<String> indicesMatcher) {
    assertThat(indicesMatcher.test("foobar"), is(false));
    assertThat(indicesMatcher.test("fool"), is(false));
    assertThat(indicesMatcher.test("fool2bar"), is(true));
    assertThat(indicesMatcher.test("baz_foo"), is(true));
    assertThat(indicesMatcher.test("barbapapa"), is(false));
}
}
/*
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 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissions;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition;

import java.util.ArrayList;
import java.util.List;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReferenceArray;

import static org.hamcrest.Matchers.containsString;

public class FieldPermissionsTests extends ESTestCase {

    public void testParseFieldPermissions() throws Exception {
        String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
            \"field_security\": { \" +
            \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"], \" +
            \"except\": [\"f3\", \"f4\"] \" +
            \"}}}]";
        RoleDescriptor rd =
            RoleDescriptor.parse("test", new BytesArray(q), false, XContentType.JSON);
        assertThatEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
            new String[] { "f1", "f2", "f3", "f4" });
    }
}

```

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assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
    new String[] { "f3", "f4" });

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": {\" +
    \"except\": [\"f3\", \"f4\"],\" +
    \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"]\" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
    new String[] { "f1", "f2", "f3", "f4" });
assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
    new String[] { "f3", "f4" });

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": {\" +
    \"grant\": [\"f1\", \"f2\"]\" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
    new String[] { "f1", "f2" });
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": {\" +
    \"grant\": []\" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": {\" +
    \"except\": [],\" +
    \"grant\": []\" +
    \"}}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(), new String[] {});

final String exceptWithoutGrant = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \" [\"p3\", \"field_security\": {\" +
    \"except\": [\"f1\"]\" +
    \"}}}]";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptWithoutGrant), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),

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containsString("failed to parse indices privileges for role [test]. field_security"
    + " requires grant if except is given"));

final String grantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"],\" +
    \"field_security\": {\" +
    \"grant\": null\" +
    \"}}]\"";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(grantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for" +
    " role [test]. grant must not be null.));

final String exceptNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    [\"p3\"], \"field_security\": {\" +
    \"grant\": [\"*\",\" +
    \"except\": null\" +
    \"}}]\"";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),
    containsString("failed to parse indices privileges for role [test]. except must" +
        " not be null.));

final String exceptGrantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    [\"p3\"], \"field_security\": {\" +
    \"grant\": null,\" +
    \"except\": null\" +
    \"}}]\"";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptGrantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
    "for role [test]. grant must not be null.));

final String bothFieldsMissing = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    [\"p3\"], \"field_security\": {\" +
    \"}}]\"";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(bothFieldsMissing), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
    "for role [test]. \"field_security\" must not be empty.));

// try with two indices and mix order a little
q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
    \"field_security\": {\" +

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```

        "\grant\": []" +
        "}}," +
        "{\"names\": \"idx3\", \"n\" +
        \"field_security\": {\"n\" +
        \"grant\": [\"*\"], \"n\" +
        \"except\": [\"f2\"]}," +
        "\"privileges\": [\"p3\"]}}";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
assertArrayEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"*"});
assertArrayEquals(rd.getIndicesPrivileges()[1].getDeniedFields(), new String[] {"f2"});
}

```

// test old syntax for field permissions

```

public void testBWCFIELDPermissions() throws Exception {
    String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": [\"f1\", \"f2\"]\" +
        \"}}";
    RoleDescriptor rd = RoleDescriptor.parse("test", new ByteArray(q), true,
        XContentType.JSON);
    assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[]{"f1", "f2"});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

    final String failingQuery = q;
    ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": []\" +
        \"}}";
    rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
    assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
    final String failingQuery2 = q;
    e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery2), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +

```



```

        "\"fields\": null" +
        "}}]";
rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
assertNull(rd.getIndicesPrivileges()[0].getGrantedFields());
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery3 = q;
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(failingQuery3), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has " +
    "changed for field permissions in role [test]" +
    ", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));
}

public void testFieldPermissionsHashCodeThreadSafe() throws Exception {
    final int numThreads = scaledRandomIntBetween(4, 16);
    final FieldPermissions fieldPermissions =new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "*" }, new String[] { "foo" }));
    final CountdownLatch latch = new CountdownLatch(numThreads + 1);
    final AtomicReferenceArray<Integer> hashCodes = new AtomicReferenceArray<>(numThreads);
    List<Thread> threads = new ArrayList<>(numThreads);
    for (int i = 0; i < numThreads; i++) {
        final int threadNum = i;
        threads.add(new Thread(() -> {
            latch.countDown();
            try {
                latch.await();
            } catch (InterruptedException e) {
                Thread.currentThread().interrupt();
            }
            final int hashCode = fieldPermissions.hashCode();
            hashCodes.set(threadNum, hashCode);
        }));
    }

    for (Thread thread : threads) {
        thread.start();
    }
    latch.countDown();
    for (Thread thread : threads) {
        thread.join();
    }

    final int hashCode = fieldPermissions.hashCode();
    for (int i = 0; i < numThreads; i++) {
        assertEquals((Integer) hashCode, hashCodes.get(i));
    }
}

```

```

}
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 */
package org.elasticsearch.license;

import org.apache.http.message.BasicHeader;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.DocWriteResponse;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.stats.NodesStatsResponse;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsIndices;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsResponse;
import org.elasticsearch.action.admin.indices.stats.IndicesStatsResponse;
import org.elasticsearch.action.index.IndexResponse;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.transport.NoNodeAvailableException;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.routing.ShardRoutingState;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.SecureString;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.util.concurrent.ThreadContext;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.SecurityIntegTestCase;
import org.elasticsearch.test.SecuritySettingsSource;
import org.elasticsearch.test.SecuritySettingsSourceField;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.security.SecurityField;
import org.elasticsearch.xpack.core.security.action.user.GetUsersResponse;
import org.elasticsearch.xpack.core.security.authc.support.UsernamePasswordToken;
import org.elasticsearch.xpack.core.security.client.SecurityClient;
import org.elasticsearch.xpack.security.LocalStateSecurity;
import org.junit.After;
import org.junit.Before;

import java.util.ArrayList;
import java.util.Collection;

```

```

import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertNoFailures;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.greaterThanOrEqualTo;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

@TestLogging("org.elasticsearch.cluster.service:TRACE,org.elasticsearch.discovery.zen:TRACE,org.elasticsearch.
action.search:TRACE," +
    "org.elasticsearch.search:TRACE")
public class LicensingTests extends SecurityIntegTestCase {
    public static final String ROLES =
        SecuritySettingsSource.TEST_ROLE + "\n" +
        " cluster: [ all ]\n" +
        " indices:\n" +
        "   - names: '*'\n" +
        "   privileges: [manage]\n" +
        "   - names: '*/'\n" +
        "   privileges: [write]\n" +
        "   - names: 'test'\n" +
        "   privileges: [read]\n" +
        "   - names: 'test1'\n" +
        "   privileges: [read]\n" +
        "\n" +
        "role_a:\n" +
        " indices:\n" +
        "   - names: 'a'\n" +
        "   privileges: [all]\n" +
        "\n" +
        "role_b:\n" +
        " indices:\n" +
        "   - names: 'b'\n" +
        "   privileges: [all]\n";

    public static final String USERS =
        SecuritySettingsSource.CONFIG_STANDARD_USER +
        "user_a:{plain}passwd\n" +
        "user_b:{plain}passwd\n";

    public static final String USERS_ROLES =
        SecuritySettingsSource.CONFIG_STANDARD_USER_ROLES +
        "role_a:user_a,user_b\n" +
        "role_b:user_b\n";

    @Override
    protected String configRoles() {
        return ROLES;
    }
}

```

```

}

@Override
protected String configUsers() {
    return USERS;
}

@Override
protected String configUsersRoles() {
    return USERS_ROLES;
}

@Override
protected boolean addMockHttpTransport() {
    return false; // enable http
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(Netty4Plugin.class); // for http
    return plugins;
}

@Before
public void resetLicensing() {
    enableLicensing();
}

@After
public void cleanupSecurityIndex() {
    deleteSecurityIndex();
}

public void testEnableDisableBehaviour() throws Exception {
    IndexResponse indexResponse = index("test", "type", jsonBuilder()
        .startObject()
        .field("name", "value")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    indexResponse = index("test1", "type", jsonBuilder()
        .startObject()
        .field("name", "value1")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());
}

```

```

refresh();
// wait for all replicas to be started (to make sure that there are no more cluster state updates when we disable
licensing)
assertBusy(() -> assertTrue(client().admin().cluster().prepareState().get().getState().routingTable()
    .shardsWithState(ShardRoutingState.INITIALIZING).isEmpty()));

Client client = internalCluster().transportClient();

disableLicensing();

assertElasticsearchSecurityException(() -> client.admin().indices().prepareStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareClusterStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareHealth().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareNodesStats().get());

enableLicensing(randomFrom(License.OperationMode.values()));

IndicesStatsResponse indicesStatsResponse = client.admin().indices().prepareStats().get();
assertNoFailures(indicesStatsResponse);

ClusterStatsResponse clusterStatsNodeResponse = client.admin().cluster().prepareClusterStats().get();
assertThat(clusterStatsNodeResponse, notNullValue());
ClusterStatsIndices indices = clusterStatsNodeResponse.getIndicesStats();
assertThat(indices, notNullValue());
assertThat(indices.getIndexCount(), greaterThanOrEqualTo(2));

ClusterHealthResponse clusterIndexHealth = client.admin().cluster().prepareHealth().get();
assertThat(clusterIndexHealth, notNullValue());

NodesStatsResponse nodeStats = client.admin().cluster().prepareNodesStats().get();
assertThat(nodeStats, notNullValue());
}

public void testRestAuthenticationByLicenseType() throws Exception {
    Response response = getRestClient().performRequest("GET", "");
    // the default of the licensing tests is basic
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    ResponseException e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(403));

    // generate a new license with a mode that enables auth
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    e = expectThrows(ResponseException.class, () -> getRestClient().performRequest("GET", ""));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));
}

```

```

e = expectThrows(ResponseException.class,
    () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));

final String basicAuthValue =
UsernamePasswordToken.basicAuthHeaderValue(SecuritySettingsSource.TEST_USER_NAME,
    new SecureString(SecuritySettingsSourceField.TEST_PASSWORD.toCharArray()));
response = getRestClient().performRequest("GET", "/", new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));
response = getRestClient().performRequest("GET", "/_xpack/security/_authenticate",
    new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));

}

public void testSecurityActionsByLicenseType() throws Exception {
    // security actions should not work!
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        new SecurityClient(client).prepareGetUsers().get();
        fail("security actions should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
    }

    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    // security actions should not work!
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        GetUsersResponse response = new SecurityClient(client).prepareGetUsers().get();
        assertNotNull(response);
    }
}

public void testTransportClientAuthenticationByLicenseType() throws Exception {
    Settings.Builder builder = Settings.builder()
        .put(internalCluster().transportClient().settings());
    // remove user info
    builder.remove(SecurityField.USER_SETTING.getKey());
    builder.remove(ThreadContext.PREFIX + "." + UsernamePasswordToken.BASIC_AUTH_HEADER);
}

```

```

// basic has no auth
try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    assertGreenClusterState(client);
}

// enable a license that enables security
License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
    License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    client.admin().cluster().prepareHealth().get();
    fail("should not have been able to connect to a node!");
} catch (NoNodeAvailableException e) {
    // expected
}

private static void assertElasticsearchSecurityException(ThrowingRunnable runnable) {
    ElasticsearchSecurityException ee = expectThrows(ElasticsearchSecurityException.class, runnable);
    assertThat(ee.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.SECURITY));
    assertThat(ee.status(), is(RestStatus.FORBIDDEN));
}

public static void disableLicensing() {
    disableLicensing(License.OperationMode.BASIC);
}

public static void disableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, false);
    }
}

public static void enableLicensing() {
    enableLicensing(License.OperationMode.BASIC);
}

public static void enableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, true);
    }
}

```

```
}  
}  
}
```

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// -----  
// Transitive dependencies of this project determined from the  
// maven pom organized by organization.  
// -----
```

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From: 'an unknown organization'

- geronimo-jms_1.1_spec org.apache.geronimo.specs:geronimo-jms_1.1_spec:jar:1.0

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The art of simplicity is a puzzle of complexity.

Overview

[YAML](<http://yaml.org>) is a data serialization format designed for human readability and interaction with scripting languages.

SnakeYAML is a YAML processor for the Java Virtual Machine.

SnakeYAML features

* a **complete** [YAML 1.1 processor](<http://yaml.org/spec/1.1/current.html>). In particular, SnakeYAML can parse all examples from the specification.

* Unicode support including UTF-8/UTF-16 input/output.

* high-level API for serializing and deserializing native Java objects.

* support for all types from the [YAML types repository](<http://yaml.org/type/index.html>).

* relatively sensible error messages.

Info

* [Changes](<https://bitbucket.org/asomov/snakeyaml/wiki/Changes>)

* [Documentation](<https://bitbucket.org/asomov/snakeyaml/wiki/Documentation>)

Contribute

* Mercurial DVCS is used to dance with the [source code](<https://bitbucket.org/asomov/snakeyaml/src>).

* If you find a bug in SnakeYAML, please [file a bug report](<https://bitbucket.org/asomov/snakeyaml/issues?status=new&status=open>).

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analysis/common/src/java/net/sf/snowball
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analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
See <http://members.unine.ch/jacques.savoy/clef/index.html>.

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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

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doc/sitemap_gen.py

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util/unlink.py

backport from python3 Lib/test/support.py

4.17 haproxy 1.5.8

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

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Willy Tarreau - w@lwt.eu

4.18 jq 1.3-1.1ubuntu1

4.18.1 Available under license :

Format: <http://www.debian.org/doc/packaging-manuals/copyright-format/1.0/>

Upstream-Name: jq

Source: <<https://github.com/stedolan/jq>>

Files: *

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4.19 json 1.7.7

4.20 jsonpath 0.5.8

4.21 libgeoip1 1.6.0-1

4.22 linkerD 1.3.0-SNAPSHOT

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4.23 lua-cjson 2.1.0

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4.24 lua-resty-redis 0.1

4.25 Monit 5.5 :1.e15.rf

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4.30 net-ping 2.0.1

4.31 nginx 1.8.1

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4.33 nomad v0.7.0

4.34 ntp 4.2.8p4

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4. [4]Viraj Bais <vbais@mailman1.intel.com> and [5]Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
5. [6]Michael Barone <michael,barone@lmco.com> GPSVME fixes

6. [7]Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
7. [8]Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.
8. [9]Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver
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34. [37]Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication
35. [38]Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305

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 38. [41]Wolfgang Moeller <moeller@gwdgv1.dnet.gwdg.de> VMS port
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 42. [45]Derek Mulcahy <derek@toybox.demon.co.uk> and [46]Damon Hart-Davis <d@hd.org> ARCRON MSF clock driver
 43. [47]Rob Neal <neal@ntp.org> Bancomm refclock and config/parse code maintenance
 44. [48]Rainer Pruy <Rainer.Pruy@informatik.uni-erlangen.de> monitoring/trap scripts, statistics file handling
 45. [49]Dirce Richards <dirce@zk3.dec.com> Digital UNIX V4.0 port
 46. [50]Wilfredo Snchez <wsanchez@apple.com> added support for NetInfo
 47. [51]Nick Sayer <mrapple@quack.kfu.com> SunOS streams modules
 48. [52]Jack Sasportas <jack@innovativeinternet.com> Saved a Lot of space on the stuff in the html/pic/ subdirectory
 49. [53]Ray Schnitzler <schnitz@unipress.com> Unixware1 port
 50. [54]Michael Shields <shields@tembel.org> USNO clock driver
 51. [55]Jeff Steinman <jss@pebbles.jpl.nasa.gov> Datum PTS clock driver
 52. [56]Harlan Stenn <harlan@pfc.com> GNU automake/autoconfigure makeover, various other bits (see the ChangeLog)
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 57. [61]Loganaden Velvindron <loganaden@gmail.com> Sandboxing (libseccomp) support
 58. [62]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver
 59. [63]Ulrich Windl <Ulrich.Windl@rz.uni-regensburg.de> corrected and validated HTML documents according to the HTML DTD
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```
/* -*- Mode: Text -*- */
```

```
copyright = {  
  date = "1992-2015";  
  owner = "The University of Delaware and Network Time Foundation";  
  eaddr = "http://bugs.ntp.org, bugs@ntp.org";  
  type = ntp;  
};
```

```
long-opts;  
config-header = config.h;  
environrc;  
no-misuse-usage;  
version-proc = ntpOptionPrintVersion;
```

```
version      = `  
eval VERSION=\`sed -e 's/.*;\\[//' -e 's/^\\.*/' < ../sntp/m4/version.m4\  
[ -z "${VERSION}" ] && echo "Cannot determine VERSION" && kill -TERM $AG_pid  
echo $VERSION`;
```

```
version-value = "; /* Don't use -v as a shortcut for --version */
```

```
/*  
* HMS: man pages already have this, and texi pages can use the  
* values in sntp/include/version.texi .  
*/  
// doc-sub = {  
//   sub-name = version;  
//   sub-text = 's/#VERSION#/<<version>>/g';  
// };  
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">  
<html>  
<head>  
<meta http-equiv="content-type" content="text/html; charset=iso-8859-1">
```



```

<title>Copyright Notice</title>
<!-- Changed by: Harlan Stenn, 10-Mar-2014 -->
<link href="scripts/style.css" type="text/css" rel="stylesheet">
</head>
<body>
<h3>Copyright Notice</h3>
 "Clone me," says Dolly sheepishly.
<p>Last update:
<!-- #BeginDate format:En2m -->17-Jan-2015 00:16<!-- #EndDate -->
  UTC</p>
<br clear="left">
</p>
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- Mark Andrews <mark_andrews@isc.org> Leitch atomic clock controller
- Bernd Altmeier <altmeier@atsoft.de> hopf Elektronik serial line and PCI-bus devices
- Viraj Bais <vbais@mailman1.intel.com> and Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
- Michael Barone <michael,barone@lmco.com> GPSVME fixes
- Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
- Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.
- Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver
- Piete Brooks <Piete.Brooks@cl.cam.ac.uk> MSF clock driver, Trimble PARSE support
- Nelson B Bolyard <nelson@bolyard.me> update and complete broadcast and crypto features in snpt
- Jean-Francois Boudreault <Jean-Francois.Boudreault@viagenie.qc.ca> IPv6 support
- Reg Clemens <reg@dwf.com> Oncore driver (Current maintainer)
- Steve Clift <clift@ml.csiro.au> OMEGA clock driver

Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration

Sven Dietrich <sven_dietrich@trimble.com> Palisade reference clock driver, NT adj. residuals, integrated Greg's Winnt port.

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Torsten Duwe <duwe@immd4.informatik.uni-erlangen.de> Linux port

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Glenn Hollinger <glenn@herald.usask.ca> GOES clock driver

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Craig Leres <leres@ee.lbl.gov> 4.4BSD port, pps clock, Magnavox GPS clock driver

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Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication

Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305

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```

```
package java.security;
```

```

/**
 * Abstract class for representing access to a system resource.
 * All permissions have a name (whose interpretation depends on the subclass),
 * as well as abstract functions for defining the semantics of the
 * particular Permission subclass.
 *
 * <p>Most Permission objects also include an "actions" list that tells the actions
 * that are permitted for the object. For example,
 * for a { @code java.io.FilePermission } object, the permission name is
 * the pathname of a file (or directory), and the actions list
 * (such as "read, write") specifies which actions are granted for the
 * specified file (or for files in the specified directory).
 * The actions list is optional for Permission objects, such as
 * { @code java.lang.RuntimePermission },
 * that don't need such a list; you either have the named permission (such
 * as "system.exit") or you don't.
 *
 * <p>An important method that must be implemented by each subclass is
 * the { @code implies } method to compare Permissions. Basically,
 * "permission p1 implies permission p2" means that
 * if one is granted permission p1, one is naturally granted permission p2.
 * Thus, this is not an equality test, but rather more of a
 * subset test.
 *
 * <P> Permission objects are similar to String objects in that they
 * are immutable once they have been created. Subclasses should not
 * provide methods that can change the state of a permission
 * once it has been created.
 *
 * @see Permissions

```



```

* @see PermissionCollection
*
*
* @author Marianne Mueller
* @author Roland Schemers
*/

public abstract class Permission implements Guard, java.io.Serializable {

    private static final long serialVersionUID = -5636570222231596674L;

    private String name;

    /**
     * Constructs a permission with the specified name.
     *
     * @param name name of the Permission object being created.
     *
     */

    public Permission(String name) {
        this.name = name;
    }

    /**
     * Implements the guard interface for a permission. The
     * { @code SecurityManager.checkPermission} method is called,
     * passing this permission object as the permission to check.
     * Returns silently if access is granted. Otherwise, throws
     * a SecurityException.
     *
     * @param object the object being guarded (currently ignored).
     *
     * @throws SecurityException
     *     if a security manager exists and its
     *     { @code checkPermission} method doesn't allow access.
     *
     * @see Guard
     * @see GuardedObject
     * @see SecurityManager#checkPermission
     *
     */

    public void checkGuard(Object object) throws SecurityException {
        SecurityManager sm = System.getSecurityManager();
        if (sm != null) sm.checkPermission(this);
    }

    /**

```

```

* Checks if the specified permission's actions are "implied by"
* this object's actions.
* <P>
* This must be implemented by subclasses of Permission, as they are the
* only ones that can impose semantics on a Permission object.
*
* <p>The { @code implies } method is used by the AccessController to determine
* whether or not a requested permission is implied by another permission that
* is known to be valid in the current execution context.
*
* @param permission the permission to check against.
*
* @return true if the specified permission is implied by this object,
* false if not.
*/

```

```

public abstract boolean implies(Permission permission);

```

```

/**
* Checks two Permission objects for equality.
* <P>
* Do not use the { @code equals } method for making access control
* decisions; use the { @code implies } method.
*
* @param obj the object we are testing for equality with this object.
*
* @return true if both Permission objects are equivalent.
*/

```

```

public abstract boolean equals(Object obj);

```

```

/**
* Returns the hash code value for this Permission object.
* <P>
* The required { @code hashCode } behavior for Permission Objects is
* the following:
* <ul>
* <li>Whenever it is invoked on the same Permission object more than
* once during an execution of a Java application, the
* { @code hashCode } method
* must consistently return the same integer. This integer need not
* remain consistent from one execution of an application to another
* execution of the same application.
* <li>If two Permission objects are equal according to the
* { @code equals }
* method, then calling the { @code hashCode } method on each of the
* two Permission objects must produce the same integer result.
* </ul>

```

```

*
* @return a hash code value for this object.
*/

public abstract int hashCode();

/**
 * Returns the name of this Permission.
 * For example, in the case of a { @code java.io.FilePermission },
 * the name will be a pathname.
 *
 * @return the name of this Permission.
 *
 */

public final String getName() {
    return name;
}

/**
 * Returns the actions as a String. This is abstract
 * so subclasses can defer creating a String representation until
 * one is needed. Subclasses should always return actions in what they
 * consider to be their
 * canonical form. For example, two FilePermission objects created via
 * the following:
 *
 * <pre>
 * perm1 = new FilePermission(p1,"read,write");
 * perm2 = new FilePermission(p2,"write,read");
 * </pre>
 *
 * both return
 * "read,write" when the { @code getActions } method is invoked.
 *
 * @return the actions of this Permission.
 *
 */

public abstract String getActions();

/**
 * Returns an empty PermissionCollection for a given Permission object, or null if
 * one is not defined. Subclasses of class Permission should
 * override this if they need to store their permissions in a particular
 * PermissionCollection object in order to provide the correct semantics
 * when the { @code PermissionCollection.implies } method is called.
 * If null is returned,

```

```

* then the caller of this method is free to store permissions of this
* type in any PermissionCollection they choose (one that uses a Hashtable,
* one that uses a Vector, etc).
*
* @return a new PermissionCollection object for this type of Permission, or
* null if one is not defined.
*/

public PermissionCollection newPermissionCollection() {
    return null;
}

/**
 * Returns a string describing this Permission. The convention is to
 * specify the class name, the permission name, and the actions in
 * the following format: '("ClassName" "name" "actions")', or
 * '("ClassName" "name")' if actions list is null or empty.
 *
 * @return information about this Permission.
 */
public String toString() {
    String actions = getActions();
    if ((actions == null) || (actions.length() == 0)) { // OPTIONAL
        return "(" + getClass().getName() + "\" \" + name + "\"";
    } else {
        return "(" + getClass().getName() + "\" \" + name +
            "\" \" + actions + "\"";
    }
}

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*/

```
package java.security.acl;
```

```
/**
```

```
* This interface represents a permission, such as that used to grant  
* a particular type of access to a resource.
```

```
*
```

```
* @author Satish Dharmaraj
```

```
*/
```

```
public interface Permission {
```

```
/**
```

```
* Returns true if the object passed matches the permission represented  
* in this interface.
```

```
*
```

```
* @param another the Permission object to compare with.
```

```
*
```

```
* @return true if the Permission objects are equal, false otherwise
```

```
*/
```

```
public boolean equals(Object another);
```

```
/**
```

```
* Prints a string representation of this permission.
```

```
*
```

```
* @return the string representation of the permission.
```

```
*/
```

```
public String toString();
```

```
}
```

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# Version

# Uses Fedora Core 6 fonts and file paths.
version=1

# Component Font Mappings

dialog.plain.latin-1=DejaVu LGC Sans
dialog.plain.japanese-x0208=Sazanami Gothic
dialog.plain.korean=Baekmuk Gulim
dialog.plain.chinese-big5=AR PL ShanHeiSun Uni
dialog.plain.chinese-gb18030=AR PL ShanHeiSun Uni

dialog.bold.latin-1=DejaVu LGC Sans Bold
dialog.bold.japanese-x0208=Sazanami Gothic
dialog.bold.korean=Baekmuk Gulim
dialog.bold.chinese-big5=AR PL ShanHeiSun Uni
dialog.bold.chinese-gb18030=AR PL ShanHeiSun Uni

dialog.italic.latin-1=DejaVu LGC Sans Oblique
dialog.italic.japanese-x0208=Sazanami Gothic
dialog.italic.korean=Baekmuk Gulim
dialog.italic.chinese-big5=AR PL ShanHeiSun Uni
dialog.italic.chinese-gb18030=AR PL ShanHeiSun Uni

dialog.bolditalic.latin-1=DejaVu LGC Sans Bold Oblique
dialog.bolditalic.japanese-x0208=Sazanami Gothic
dialog.bolditalic.korean=Baekmuk Gulim
dialog.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
dialog.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni
```

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serif.plain.latin-1=DejaVu LGC Serif
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Search Sequences

sequence.allfonts=latin-1
sequence.allfonts.Big5=chinese-big5,latin-1
sequence.allfonts.x-euc-jp-bsd=japanese-x0208,latin-1
sequence.allfonts.EUC-KR=korean,latin-1
sequence.allfonts.GB18030=chinese-gb18030,latin-1
sequence.fallback=chinese-big5,chinese-gb18030,japanese-x0208,korean

Font File Names

filename.DejaVu_LGC_Sans=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans.ttf
filename.DejaVu_LGC_Sans_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Bold.ttf
filename.DejaVu_LGC_Sans_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Oblique.ttf
filename.DejaVu_LGC_Sans_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-BoldOblique.ttf

filename.DejaVu_LGC_Sans_Mono=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono.ttf
filename.DejaVu_LGC_Sans_Mono_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Bold.ttf
filename.DejaVu_LGC_Sans_Mono_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Oblique.ttf
filename.DejaVu_LGC_Sans_Mono_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-BoldOblique.ttf

filename.DejaVu_LGC_Serif=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif.ttf
filename.DejaVu_LGC_Serif_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Bold.ttf
filename.DejaVu_LGC_Serif_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Oblique.ttf
filename.DejaVu_LGC_Serif_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-BoldOblique.ttf

filename.Sazanami_Gothic=/usr/share/fonts/japanese/TrueType/sazanami-gothic.ttf
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```

```
package build.tools.cldrconverter;
```

```
import java.util.Calendar;
import java.util.GregorianCalendar;
import java.util.Locale;
import java.util.TimeZone;
```

```
class CopyrightHeaders {
    private static final String ORACLE2012 =
        "/*\n" +
        " * Copyright (c) %d, Oracle and/or its affiliates. All rights reserved.\n" +
        " */\n";

    private static final String ORACLE_AFTER2012 =
        "/*\n" +
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        " */\n";

    private static final String UNICODE =
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" */\n";

```

```
private static String OPENJDK2012 =
```

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```

```

    " */\n";

private static String OPENJDK_AFTER2012 =
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    " * questions.\n" +
    " */\n";

static String getOracleCopyright() {
    int year = getYear();
    return String.format(year > 2012 ? ORACLE_AFTER2012 : ORACLE2012, year);
}

static String getUnicodeCopyright() {
    return UNICODE;
}

static String getOpenJDKCopyright() {
    int year = getYear();
    return String.format(year > 2012 ? OPENJDK_AFTER2012 : OPENJDK2012, year);
}

private static int getYear() {
    return new GregorianCalendar(TimeZone.getTimeZone("America/Los_Angeles"),
        Locale.US).get(Calendar.YEAR);
}

// no instantiation

```

```

private CopyrightHeaders() {
}
}
#
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```

```
import org.somewhere.ws.EchoRequest;
import org.somewhere.ws.EchoResponse;
```

```
public class CopyingResponse extends EchoResponse {
```

```
    public CopyingResponse() { }
```

```
    public CopyingResponse(EchoRequest request) {
        content = request.getContent();
    }
```

```
    }
    /*
```

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    * questions.
    */
```

```
/**
```

```
 *
 */
```

```
import java.rmi.Remote;
public interface Legal extends Remote {};
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It was downloaded from

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  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html>
<head>
  <meta http-equiv="Content-Type" content="text/html; charset=us-ascii" />
  <title>W3C IPR SOFTWARE NOTICE</title>
<style type="text/css">
<!--
html, body { background: #fff; color: #000; } /* body for Windows IE3 */
-->
</style>
</head>
<body>
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  </h1>
  <h3>
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```

```
package java.security;
```

```
/**
 * Abstract class for representing access to a system resource.
 * All permissions have a name (whose interpretation depends on the subclass),
 * as well as abstract functions for defining the semantics of the
 * particular Permission subclass.
 *
 * <p>Most Permission objects also include an "actions" list that tells the actions
 * that are permitted for the object. For example,
 * for a { @code java.io.FilePermission } object, the permission name is
 * the pathname of a file (or directory), and the actions list
 * (such as "read, write") specifies which actions are granted for the
 * specified file (or for files in the specified directory).
 * The actions list is optional for Permission objects, such as
 * { @code java.lang.RuntimePermission },
 * that don't need such a list; you either have the named permission (such
 * as "system.exit") or you don't.
 *
 * <p>An important method that must be implemented by each subclass is
 * the { @code implies } method to compare Permissions. Basically,
 * "permission p1 implies permission p2" means that
 * if one is granted permission p1, one is naturally granted permission p2.
 * Thus, this is not an equality test, but rather more of a
 * subset test.
 */
```

```

* <P> Permission objects are similar to String objects in that they
* are immutable once they have been created. Subclasses should not
* provide methods that can change the state of a permission
* once it has been created.
*
* @see Permissions
* @see PermissionCollection
*
*
* @author Marianne Mueller
* @author Roland Schemers
*/

```

```

public abstract class Permission implements Guard, java.io.Serializable {

    private static final long serialVersionUID = -5636570222231596674L;

    private String name;

    /**
     * Constructs a permission with the specified name.
     *
     * @param name name of the Permission object being created.
     *
     */

    public Permission(String name) {
        this.name = name;
    }

    /**
     * Implements the guard interface for a permission. The
     * { @code SecurityManager.checkPermission } method is called,
     * passing this permission object as the permission to check.
     * Returns silently if access is granted. Otherwise, throws
     * a SecurityException.
     *
     * @param object the object being guarded (currently ignored).
     *
     * @throws SecurityException
     *     if a security manager exists and its
     *     { @code checkPermission } method doesn't allow access.
     *
     * @see Guard
     * @see GuardedObject
     * @see SecurityManager#checkPermission
     *
     */
}

```

```

public void checkGuard(Object object) throws SecurityException {
    SecurityManager sm = System.getSecurityManager();
    if (sm != null) sm.checkPermission(this);
}

/**
 * Checks if the specified permission's actions are "implied by"
 * this object's actions.
 * <P>
 * This must be implemented by subclasses of Permission, as they are the
 * only ones that can impose semantics on a Permission object.
 *
 * <p>The { @code implies } method is used by the AccessController to determine
 * whether or not a requested permission is implied by another permission that
 * is known to be valid in the current execution context.
 *
 * @param permission the permission to check against.
 *
 * @return true if the specified permission is implied by this object,
 * false if not.
 */

public abstract boolean implies(Permission permission);

/**
 * Checks two Permission objects for equality.
 * <P>
 * Do not use the { @code equals } method for making access control
 * decisions; use the { @code implies } method.
 *
 * @param obj the object we are testing for equality with this object.
 *
 * @return true if both Permission objects are equivalent.
 */

public abstract boolean equals(Object obj);

/**
 * Returns the hash code value for this Permission object.
 * <P>
 * The required { @code hashCode } behavior for Permission Objects is
 * the following:
 * <ul>
 * <li>Whenever it is invoked on the same Permission object more than
 * once during an execution of a Java application, the
 * { @code hashCode } method
 * must consistently return the same integer. This integer need not
 * remain consistent from one execution of an application to another

```

```

*   execution of the same application.
*   <li>If two Permission objects are equal according to the
*       { @code equals }
*   method, then calling the { @code hashCode } method on each of the
*   two Permission objects must produce the same integer result.
* </ul>
*
* @return a hash code value for this object.
*/

```

```
public abstract int hashCode();
```

```

/**
 * Returns the name of this Permission.
 * For example, in the case of a { @code java.io.FilePermission },
 * the name will be a pathname.
 *
 * @return the name of this Permission.
 *
 */

```

```
public final String getName() {
    return name;
}
```

```

/**
 * Returns the actions as a String. This is abstract
 * so subclasses can defer creating a String representation until
 * one is needed. Subclasses should always return actions in what they
 * consider to be their
 * canonical form. For example, two FilePermission objects created via
 * the following:
 *
 * <pre>
 * perm1 = new FilePermission(p1,"read,write");
 * perm2 = new FilePermission(p2,"write,read");
 * </pre>
 *
 * both return
 * "read,write" when the { @code getActions } method is invoked.
 *
 * @return the actions of this Permission.
 *
 */

```

```
public abstract String getActions();
```

```
/**
```

```

* Returns an empty PermissionCollection for a given Permission object, or null if
* one is not defined. Subclasses of class Permission should
* override this if they need to store their permissions in a particular
* PermissionCollection object in order to provide the correct semantics
* when the {@code PermissionCollection.implies} method is called.
* If null is returned,
* then the caller of this method is free to store permissions of this
* type in any PermissionCollection they choose (one that uses a Hashtable,
* one that uses a Vector, etc).
*
* @return a new PermissionCollection object for this type of Permission, or
* null if one is not defined.
*/

```

```

public PermissionCollection newPermissionCollection() {
    return null;
}

```

```

/**

```

```

* Returns a string describing this Permission. The convention is to
* specify the class name, the permission name, and the actions in
* the following format: ('ClassName" "name" "actions"), or
* ('ClassName" "name")' if actions list is null or empty.
*

```

```

* @return information about this Permission.
*/

```

```

public String toString() {
    String actions = getActions();
    if ((actions == null) || (actions.length() == 0)) { // OPTIONAL
        return "(" + getClass().getName() + "\" \" + name + "\")";
    } else {
        return "(" + getClass().getName() + "\" \" + name +
            "\" \" + actions + "\")";
    }
}

```

```

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```

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* questions.
*/
```

```
package java.security.acl;
```

```
/**
```

```
* This interface represents a permission, such as that used to grant
* a particular type of access to a resource.
```

```
*
```

```
* @author Satish Dharmaraj
```

```
*/
```

```
public interface Permission {
```

```
/**
```

```
* Returns true if the object passed matches the permission represented
* in this interface.
```

```
*
```

```
* @param another the Permission object to compare with.
```

```
*
```

```
* @return true if the Permission objects are equal, false otherwise
```

```
*/
```

```
public boolean equals(Object another);
```

```
/**
```

```
* Prints a string representation of this permission.
```

```
*
```

```
* @return the string representation of the permission.
```

```
*/
```

```
public String toString();
```

```
}
```

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# questions.
#
```

```
# Version
```

```
# Uses Fedora Core 6 fonts and file paths.
version=1
```

```
# Component Font Mappings
```

```
dialog.plain.latin-1=DejaVu LGC Sans
dialog.plain.japanese-x0208=Sazanami Gothic
dialog.plain.korean=Baekmuk Gulim
dialog.plain.chinese-big5=AR PL ShanHeiSun Uni
dialog.plain.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.bold.latin-1=DejaVu LGC Sans Bold
dialog.bold.japanese-x0208=Sazanami Gothic
dialog.bold.korean=Baekmuk Gulim
dialog.bold.chinese-big5=AR PL ShanHeiSun Uni
dialog.bold.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.italic.latin-1=DejaVu LGC Sans Oblique
dialog.italic.japanese-x0208=Sazanami Gothic
dialog.italic.korean=Baekmuk Gulim
dialog.italic.chinese-big5=AR PL ShanHeiSun Uni
dialog.italic.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.bolditalic.latin-1=DejaVu LGC Sans Bold Oblique
```


dialog.bolditalic.japanese-x0208=Sazanami Gothic
dialog.bolditalic.korean=Baekmuk Gulim
dialog.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
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sansserif.plain.latin-1=DejaVu LGC Sans
sansserif.plain.japanese-x0208=Sazanami Gothic
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sansserif.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
sansserif.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni

serif.plain.latin-1=DejaVu LGC Serif
serif.plain.japanese-x0208=Sazanami Mincho
serif.plain.korean=Baekmuk Batang
serif.plain.chinese-big5=AR PL ZenKai Uni
serif.plain.chinese-gb18030=AR PL ZenKai Uni

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monospaced.plain.latin-1=DejaVu LGC Sans Mono
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dialoginput.bolditalic.korean=Baekmuk Gulim
dialoginput.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
dialoginput.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni

Search Sequences

sequence.allfonts=latin-1
sequence.allfonts.Big5=chinese-big5,latin-1
sequence.allfonts.x-euc-jp-bsd=japanese-x0208,latin-1
sequence.allfonts.EUC-KR=korean,latin-1
sequence.allfonts.GB18030=chinese-gb18030,latin-1
sequence.fallback=chinese-big5,chinese-gb18030,japanese-x0208,korean

Font File Names

filename.DejaVu_LGC_Sans=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans.ttf
filename.DejaVu_LGC_Sans_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Bold.ttf
filename.DejaVu_LGC_Sans_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Oblique.ttf
filename.DejaVu_LGC_Sans_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-BoldOblique.ttf

filename.DejaVu_LGC_Sans_Mono=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono.ttf
filename.DejaVu_LGC_Sans_Mono_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Bold.ttf
filename.DejaVu_LGC_Sans_Mono_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Oblique.ttf
filename.DejaVu_LGC_Sans_Mono_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-BoldOblique.ttf

filename.DejaVu_LGC_Serif=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif.ttf
filename.DejaVu_LGC_Serif_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Bold.ttf
filename.DejaVu_LGC_Serif_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Oblique.ttf
filename.DejaVu_LGC_Serif_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-BoldOblique.ttf

filename.Sazanami_Gothic=/usr/share/fonts/japanese/TrueType/sazanami-gothic.ttf
filename.Sazanami_Mincho=/usr/share/fonts/japanese/TrueType/sazanami-mincho.ttf
filename.AR_PL_ShanHeiSun_Uni=/usr/share/fonts/chinese/TrueType/uming.ttf
filename.AR_PL_ZenKai_Uni=/usr/share/fonts/chinese/TrueType/ukai.ttf
filename.Baekmuk_Gulim=/usr/share/fonts/korean/TrueType/gulim.ttf
filename.Baekmuk_Batang=/usr/share/fonts/korean/TrueType/batang.ttf

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*/

```

```
package build.tools.cldrconverter;
```

```
import java.util.Calendar;
import java.util.GregorianCalendar;
import java.util.Locale;
import java.util.TimeZone;
```

```
class CopyrightHeaders {
    private static final String ORACLE2012 =
        "/*\n" +
        " * Copyright (c) %d, Oracle and/or its affiliates. All rights reserved.\n" +
        " */\n";

    private static final String ORACLE_AFTER2012 =
        "/*\n" +
        " * Copyright (c) 2012, %d, Oracle and/or its affiliates. All rights reserved.\n" +
        " */\n";

    private static final String UNICODE =
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" */\n";

```

```

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" *\n" +
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```

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" *\n" +
" * Please contact Oracle, 500 Oracle Parkway, Redwood Shores, CA 94065 USA\n" +
" * or visit www.oracle.com if you need additional information or have any\n" +
" * questions.\n" +
" */\n";

```

```
private static String OPENJDK_AFTER2012 =
```

```

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" * Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA.\n" +
" *\n" +
" * Please contact Oracle, 500 Oracle Parkway, Redwood Shores, CA 94065 USA\n" +
" * or visit www.oracle.com if you need additional information or have any\n" +
" * questions.\n" +
" */\n";

```

```
static String getOracleCopyright() {
```

```

    int year = getYear();
    return String.format(year > 2012 ? ORACLE_AFTER2012 : ORACLE2012, year);
}

```

```
static String getUnicodeCopyright() {
```

```

    return UNICODE;
}

```

```
static String getOpenJDKCopyright() {
```

```

    int year = getYear();
    return String.format(year > 2012 ? OPENJDK_AFTER2012 : OPENJDK2012, year);
}

```

```

private static int getYear() {
    return new GregorianCalendar(TimeZone.getTimeZone("America/Los_Angeles"),
        Locale.US).get(Calendar.YEAR);
}

// no instantiation
private CopyrightHeaders() {
}
}
#
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#

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<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=us-ascii" />
<title>W3C IPR SOFTWARE NOTICE</title>
<style type="text/css">
<!--
html, body { background: #fff; color: #000; } /* body for Windows IE3 */
-->
</style>
</head>
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</body>

</html>

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David Megginson <sax@megginson.com>

1998-05-11

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*/
```

```
import org.somewhere.ws.EchoRequest;  
import org.somewhere.ws.EchoResponse;  
  
public class CopyingResponse extends EchoResponse {  
  
    public CopyingResponse() {}  
  
    public CopyingResponse(EchoRequest request) {
```

```

        content = request.getContent();
    }
}
/*
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 * questions.
 */

/**
 *
 */
import java.rmi.Remote;
public interface Legal extends Remote {};
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```

```
platform=bsd
```

```
/*
```

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*/
```

```
package build.tools.cldrconverter;
```

```
import java.util.Calendar;
import java.util.GregorianCalendar;
import java.util.Locale;
import java.util.TimeZone;
```

```
class CopyrightHeaders {
```

```

private static final String ORACLE2012 =
    "/*\n" +
    " * Copyright (c) %d, Oracle and/or its affiliates. All rights reserved.\n" +
    " */\n";

private static final String ORACLE_AFTER2012 =
    "/*\n" +
    " * Copyright (c) 2012, %d, Oracle and/or its affiliates. All rights reserved.\n" +
    " */\n";

private static final String UNICODE =
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    " * COPYRIGHT AND PERMISSION NOTICE\n" +
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    " * Copyright (C) 1991-2012 Unicode, Inc. All rights reserved. Distributed under\n" +
    " * the Terms of Use in http://www.unicode.org/copyright.html.\n" +
    " *\n" +
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```

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" */\n";
```

```
private static String OPENJDK2012 =
```

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" */\n";
```

```
private static String OPENJDK_AFTER2012 =
```

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" * or visit www.oracle.com if you need additional information or have any\n" +
" * questions.\n" +
" */\n";

```

```

static String getOracleCopyright() {
    int year = getYear();
    return String.format(year > 2012 ? ORACLE_AFTER2012 : ORACLE2012, year);
}

static String getUnicodeCopyright() {
    return UNICODE;
}

static String getOpenJDKCopyright() {
    int year = getYear();
    return String.format(year > 2012 ? OPENJDK_AFTER2012 : OPENJDK2012, year);
}

private static int getYear() {
    return new GregorianCalendar(TimeZone.getTimeZone("America/Los_Angeles"),
        Locale.US).get(Calendar.YEAR);
}

// no instantiation
private CopyrightHeaders() {
}
}

```

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* questions.
*/

```
package java.security;
```

```
/**
```

```
* Abstract class for representing access to a system resource.  
* All permissions have a name (whose interpretation depends on the subclass),  
* as well as abstract functions for defining the semantics of the  
* particular Permission subclass.  
*  
* <p>Most Permission objects also include an "actions" list that tells the actions  
* that are permitted for the object. For example,  
* for a { @code java.io.FilePermission } object, the permission name is  
* the pathname of a file (or directory), and the actions list  
* (such as "read, write") specifies which actions are granted for the  
* specified file (or for files in the specified directory).  
* The actions list is optional for Permission objects, such as  
* { @code java.lang.RuntimePermission },  
* that don't need such a list; you either have the named permission (such  
* as "system.exit") or you don't.  
*  
* <p>An important method that must be implemented by each subclass is  
* the { @code implies } method to compare Permissions. Basically,  
* "permission p1 implies permission p2" means that  
* if one is granted permission p1, one is naturally granted permission p2.  
* Thus, this is not an equality test, but rather more of a  
* subset test.  
*  
* <P> Permission objects are similar to String objects in that they  
* are immutable once they have been created. Subclasses should not  
* provide methods that can change the state of a permission  
* once it has been created.  
*  
* @see Permissions  
* @see PermissionCollection  
*  
* @author Marianne Mueller  
* @author Roland Schemers  
*/
```

```

public abstract class Permission implements Guard, java.io.Serializable {

    private static final long serialVersionUID = -5636570222231596674L;

    private String name;

    /**
     * Constructs a permission with the specified name.
     *
     * @param name name of the Permission object being created.
     *
     */

    public Permission(String name) {
        this.name = name;
    }

    /**
     * Implements the guard interface for a permission. The
     * {@code SecurityManager.checkPermission} method is called,
     * passing this permission object as the permission to check.
     * Returns silently if access is granted. Otherwise, throws
     * a SecurityException.
     *
     * @param object the object being guarded (currently ignored).
     *
     * @throws SecurityException
     *     if a security manager exists and its
     *     {@code checkPermission} method doesn't allow access.
     *
     * @see Guard
     * @see GuardedObject
     * @see SecurityManager#checkPermission
     *
     */
    public void checkGuard(Object object) throws SecurityException {
        SecurityManager sm = System.getSecurityManager();
        if (sm != null) sm.checkPermission(this);
    }

    /**
     * Checks if the specified permission's actions are "implied by"
     * this object's actions.
     * <P>
     * This must be implemented by subclasses of Permission, as they are the
     * only ones that can impose semantics on a Permission object.
     *
     * <p>The {@code implies} method is used by the AccessController to determine

```

```
* whether or not a requested permission is implied by another permission that
* is known to be valid in the current execution context.
*
* @param permission the permission to check against.
*
* @return true if the specified permission is implied by this object,
* false if not.
*/
```

```
public abstract boolean implies(Permission permission);
```

```
/**
 * Checks two Permission objects for equality.
 * <P>
 * Do not use the { @code equals } method for making access control
 * decisions; use the { @code implies } method.
 *
 * @param obj the object we are testing for equality with this object.
 *
 * @return true if both Permission objects are equivalent.
 */
```

```
public abstract boolean equals(Object obj);
```

```
/**
 * Returns the hash code value for this Permission object.
 * <P>
 * The required { @code hashCode } behavior for Permission Objects is
 * the following:
 * <ul>
 * <li>Whenever it is invoked on the same Permission object more than
 * once during an execution of a Java application, the
 * { @code hashCode } method
 * must consistently return the same integer. This integer need not
 * remain consistent from one execution of an application to another
 * execution of the same application.
 * <li>If two Permission objects are equal according to the
 * { @code equals }
 * method, then calling the { @code hashCode } method on each of the
 * two Permission objects must produce the same integer result.
 * </ul>
 *
 * @return a hash code value for this object.
 */
```

```
public abstract int hashCode();
```

```
/**
```

```

* Returns the name of this Permission.
* For example, in the case of a { @code java.io.FilePermission },
* the name will be a pathname.
*
* @return the name of this Permission.
*
*/

public final String getName() {
    return name;
}

/**
* Returns the actions as a String. This is abstract
* so subclasses can defer creating a String representation until
* one is needed. Subclasses should always return actions in what they
* consider to be their
* canonical form. For example, two FilePermission objects created via
* the following:
*
* <pre>
* perm1 = new FilePermission(p1,"read,write");
* perm2 = new FilePermission(p2,"write,read");
* </pre>
*
* both return
* "read,write" when the { @code getActions } method is invoked.
*
* @return the actions of this Permission.
*
*/

public abstract String getActions();

/**
* Returns an empty PermissionCollection for a given Permission object, or null if
* one is not defined. Subclasses of class Permission should
* override this if they need to store their permissions in a particular
* PermissionCollection object in order to provide the correct semantics
* when the { @code PermissionCollection.implies } method is called.
* If null is returned,
* then the caller of this method is free to store permissions of this
* type in any PermissionCollection they choose (one that uses a Hashtable,
* one that uses a Vector, etc).
*
* @return a new PermissionCollection object for this type of Permission, or
* null if one is not defined.
*
*/

```

```

public PermissionCollection newPermissionCollection() {
    return null;
}

/**
 * Returns a string describing this Permission. The convention is to
 * specify the class name, the permission name, and the actions in
 * the following format: ('ClassName" "name" "actions"), or
 * ('ClassName" "name")' if actions list is null or empty.
 *
 * @return information about this Permission.
 */
public String toString() {
    String actions = getActions();
    if ((actions == null) || (actions.length() == 0)) { // OPTIONAL
        return "(" + getClass().getName() + "\" \" + name + "\"";
    } else {
        return "(" + getClass().getName() + "\" \" + name +
            "\" \" + actions + "\"";
    }
}
}
}
}
/**
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 * or visit www.oracle.com if you need additional information or have any
 * questions.
 */

```

```

package java.security.acl;

/**
 * This interface represents a permission, such as that used to grant
 * a particular type of access to a resource.
 *
 * @author Satish Dharmaraj
 */
public interface Permission {

    /**
     * Returns true if the object passed matches the permission represented
     * in this interface.
     *
     * @param another the Permission object to compare with.
     *
     * @return true if the Permission objects are equal, false otherwise
     */
    public boolean equals(Object another);

    /**
     * Prints a string representation of this permission.
     *
     * @return the string representation of the permission.
     */
    public String toString();
}

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# questions.  
#
```

```
# Version
```

```
# Uses Fedora Core 6 fonts and file paths.  
version=1
```

```
# Component Font Mappings
```

```
dialog.plain.latin-1=DejaVu LGC Sans  
dialog.plain.japanese-x0208=Sazanami Gothic  
dialog.plain.korean=Baekmuk Gulim  
dialog.plain.chinese-big5=AR PL ShanHeiSun Uni  
dialog.plain.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.bold.latin-1=DejaVu LGC Sans Bold  
dialog.bold.japanese-x0208=Sazanami Gothic  
dialog.bold.korean=Baekmuk Gulim  
dialog.bold.chinese-big5=AR PL ShanHeiSun Uni  
dialog.bold.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.italic.latin-1=DejaVu LGC Sans Oblique  
dialog.italic.japanese-x0208=Sazanami Gothic  
dialog.italic.korean=Baekmuk Gulim  
dialog.italic.chinese-big5=AR PL ShanHeiSun Uni  
dialog.italic.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
dialog.bolditalic.latin-1=DejaVu LGC Sans Bold Oblique  
dialog.bolditalic.japanese-x0208=Sazanami Gothic  
dialog.bolditalic.korean=Baekmuk Gulim  
dialog.bolditalic.chinese-big5=AR PL ShanHeiSun Uni  
dialog.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
sansserif.plain.latin-1=DejaVu LGC Sans  
sansserif.plain.japanese-x0208=Sazanami Gothic  
sansserif.plain.korean=Baekmuk Gulim  
sansserif.plain.chinese-big5=AR PL ShanHeiSun Uni  
sansserif.plain.chinese-gb18030=AR PL ShanHeiSun Uni
```

```
sansserif.bold.latin-1=DejaVu LGC Sans Bold  
sansserif.bold.japanese-x0208=Sazanami Gothic  
sansserif.bold.korean=Baekmuk Gulim
```

sansserif.bold.chinese-big5=AR PL ShanHeiSun Uni
sansserif.bold.chinese-gb18030=AR PL ShanHeiSun Uni

sansserif.italic.latin-1=DejaVu LGC Sans Oblique
sansserif.italic.japanese-x0208=Sazanami Gothic
sansserif.italic.korean=Baekmuk Gulim
sansserif.italic.chinese-big5=AR PL ShanHeiSun Uni
sansserif.italic.chinese-gb18030=AR PL ShanHeiSun Uni

sansserif.bolditalic.latin-1=DejaVu LGC Sans Bold Oblique
sansserif.bolditalic.japanese-x0208=Sazanami Gothic
sansserif.bolditalic.korean=Baekmuk Gulim
sansserif.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
sansserif.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni

serif.plain.latin-1=DejaVu LGC Serif
serif.plain.japanese-x0208=Sazanami Mincho
serif.plain.korean=Baekmuk Batang
serif.plain.chinese-big5=AR PL ZenKai Uni
serif.plain.chinese-gb18030=AR PL ZenKai Uni

serif.bold.latin-1=DejaVu LGC Serif Bold
serif.bold.japanese-x0208=Sazanami Mincho
serif.bold.korean=Baekmuk Batang
serif.bold.chinese-big5=AR PL ZenKai Uni
serif.bold.chinese-gb18030=AR PL ZenKai Uni

serif.italic.latin-1=DejaVu LGC Serif Oblique
serif.italic.japanese-x0208=Sazanami Mincho
serif.italic.korean=Baekmuk Batang
serif.italic.chinese-big5=AR PL ZenKai Uni
serif.italic.chinese-gb18030=AR PL ZenKai Uni

serif.bolditalic.latin-1=DejaVu LGC Serif Bold Oblique
serif.bolditalic.japanese-x0208=Sazanami Mincho
serif.bolditalic.korean=Baekmuk Batang
serif.bolditalic.chinese-big5=AR PL ZenKai Uni
serif.bolditalic.chinese-gb18030=AR PL ZenKai Uni

monospaced.plain.latin-1=DejaVu LGC Sans Mono
monospaced.plain.japanese-x0208=Sazanami Gothic
monospaced.plain.korean=Baekmuk Gulim
monospaced.plain.chinese-big5=AR PL ShanHeiSun Uni
monospaced.plain.chinese-gb18030=AR PL ShanHeiSun Uni

monospaced.bold.latin-1=DejaVu LGC Sans Mono Bold

monospaced.bold.japanese-x0208=Sazanami Gothic
monospaced.bold.korean=Baekmuk Gulim
monospaced.bold.chinese-big5=AR PL ShanHeiSun Uni
monospaced.bold.chinese-gb18030=AR PL ShanHeiSun Uni

monospaced.italic.latin-1=DejaVu LGC Sans Mono Oblique
monospaced.italic.japanese-x0208=Sazanami Gothic
monospaced.italic.korean=Baekmuk Gulim
monospaced.italic.chinese-big5=AR PL ShanHeiSun Uni
monospaced.italic.chinese-gb18030=AR PL ShanHeiSun Uni

monospaced.bolditalic.latin-1=DejaVu LGC Sans Mono Bold Oblique
monospaced.bolditalic.japanese-x0208=Sazanami Gothic
monospaced.bolditalic.korean=Baekmuk Gulim
monospaced.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
monospaced.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni

dialoginput.plain.latin-1=DejaVu LGC Sans Mono
dialoginput.plain.japanese-x0208=Sazanami Gothic
dialoginput.plain.korean=Baekmuk Gulim
dialoginput.plain.chinese-big5=AR PL ShanHeiSun Uni
dialoginput.plain.chinese-gb18030=AR PL ShanHeiSun Uni

dialoginput.bold.latin-1=DejaVu LGC Sans Mono Bold
dialoginput.bold.japanese-x0208=Sazanami Gothic
dialoginput.bold.korean=Baekmuk Gulim
dialoginput.bold.chinese-big5=AR PL ShanHeiSun Uni
dialoginput.bold.chinese-gb18030=AR PL ShanHeiSun Uni

dialoginput.italic.latin-1=DejaVu LGC Sans Mono Oblique
dialoginput.italic.japanese-x0208=Sazanami Gothic
dialoginput.italic.korean=Baekmuk Gulim
dialoginput.italic.chinese-big5=AR PL ShanHeiSun Uni
dialoginput.italic.chinese-gb18030=AR PL ShanHeiSun Uni

dialoginput.bolditalic.latin-1=DejaVu LGC Sans Mono Bold Oblique
dialoginput.bolditalic.japanese-x0208=Sazanami Gothic
dialoginput.bolditalic.korean=Baekmuk Gulim
dialoginput.bolditalic.chinese-big5=AR PL ShanHeiSun Uni
dialoginput.bolditalic.chinese-gb18030=AR PL ShanHeiSun Uni

Search Sequences

sequence.allfonts=latin-1
sequence.allfonts.Big5=chinese-big5,latin-1
sequence.allfonts.x-euc-jp-bsd=japanese-x0208,latin-1
sequence.allfonts.EUC-KR=korean,latin-1

sequence.allfonts.GB18030=chinese-gb18030,latin-1
sequence.fallback=chinese-big5,chinese-gb18030,japanese-x0208,korean

Font File Names

filename.DejaVu_LGC_Sans=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans.ttf
filename.DejaVu_LGC_Sans_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Bold.ttf
filename.DejaVu_LGC_Sans_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-Oblique.ttf
filename.DejaVu_LGC_Sans_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSans-BoldOblique.ttf

filename.DejaVu_LGC_Sans_Mono=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono.ttf
filename.DejaVu_LGC_Sans_Mono_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Bold.ttf
filename.DejaVu_LGC_Sans_Mono_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-Oblique.ttf
filename.DejaVu_LGC_Sans_Mono_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSansMono-
BoldOblique.ttf

filename.DejaVu_LGC_Serif=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif.ttf
filename.DejaVu_LGC_Serif_Bold=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Bold.ttf
filename.DejaVu_LGC_Serif_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-Oblique.ttf
filename.DejaVu_LGC_Serif_Bold_Oblique=/usr/share/fonts/dejavu-lgc/DejaVuLGCSerif-BoldOblique.ttf

filename.Sazanami_Gothic=/usr/share/fonts/japanese/TrueType/sazanami-gothic.ttf
filename.Sazanami_Mincho=/usr/share/fonts/japanese/TrueType/sazanami-mincho.ttf
filename.AR_PL_ShanHeiSun_Uni=/usr/share/fonts/chinese/TrueType/uming.ttf
filename.AR_PL_ZenKai_Uni=/usr/share/fonts/chinese/TrueType/ukai.ttf
filename.Baekmuk_Gulim=/usr/share/fonts/korean/TrueType/gulim.ttf
filename.Baekmuk_Batang=/usr/share/fonts/korean/TrueType/batang.ttf

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4.41 postfix 2.6.6 :8.e16

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Included for the use of the fix_strcasecmp.c module which works around a Solaris problem.

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4.42 postfix 3.1.0 :3

4.42.1 Available under license :

This is the Debian GNU/Linux prepackaged version of Postfix, a mail transport agent.

Postfix was created by Wietse Venema <wietse@porcupine.org>; the Debian package has been assembled by LaMont Jones <lamont@debian.org> from sources available from <http://www.postfix.org>, and can be cloned from git via:

```
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```

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\$Revision: 1.1.4.3 \$, Last updated \$Date: 2003/07/23 16:13:15 \$

This is the Debian GNU/Linux prepackaged version of Postfix, a mail transport agent.

Postfix was created by Wietse Venema <wietse@porcupine.org>; the Debian package has been assembled by LaMont Jones <lamont@debian.org> from sources available from <http://www.postfix.org>, and can be cloned from git via:
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\$Revision: 1.1.4.3 \$, Last updated \$Date: 2003/07/23 16:13:15 \$

Author:

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- Postfix/TLS support was originally developed by Lutz Jaenicke of Brandenburg University of Technology, Cottbus, Germany.

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Included for the use of the fix_strcasecmp.c module which works around a Solaris problem.

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4.43 puppet 3.4.3

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Puppet - Automating Configuration Management.

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4.44 puppet 3.8.5

4.44.1 Available under license :

Format-Specification: <http://svn.debian.org/wsvn/dep/web/deps/dep5.mdwn?op=file&rev=135>

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Source: [git://github.com/puppetlabs/puppet.git](http://github.com/puppetlabs/puppet.git),

<http://puppetlabs.com/trac/puppet/wiki/DownloadingPuppet>

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Files: test/ral/providers/service/debian.rb

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Files: examples/modules/sample-module/lib/puppet/parser/functions/hostname_to_dn.rb

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require 'puppet/util/feature'

#Is the pe license library installed providing the ability to read licenses.

```
Puppet.features.add(:pe_license, :libs => % {pe_license})
```

Manage FreeBSD services.

```
Puppet::Type.type(:service).provide :bsd, :parent => :init do
```

```
  desc <<-EOT
```

```
    FreeBSD's (and probably NetBSD's?) form of `init`-style service management.
```

Uses `rc.conf.d` for service enabling and disabling.

EOT

```
confine :operatingsystem => [:freebsd, :netbsd, :openbsd, :dragonfly]
```

```
def rconf_dir
  '/etc/rc.conf.d'
end
```

```
def self.defpath
  superclass.defpath
end
```

```
# remove service file from rc.conf.d to disable it
```

```
def disable
  rfile = File.join(rconf_dir, @model[:name])
  File.delete(rfile) if Puppet::FileSystem.exist?(rfile)
end
```

```
# if the service file exists in rc.conf.d then it's already enabled
```

```
def enabled?
  rfile = File.join(rconf_dir, @model[:name])
  return :true if Puppet::FileSystem.exist?(rfile)
```

```
  :false
end
```

```
# enable service by creating a service file under rc.conf.d with the
```

```
# proper contents
```

```
def enable
  Dir.mkdir(rconf_dir) if not Puppet::FileSystem.exist?(rconf_dir)
  rfile = File.join(rconf_dir, @model[:name])
  open(rfile, 'w') { |f| f << "%s_enable=\"YES\"\n" % @model[:name] }
end
```

```
# Override stop/start commands to use one<cmd>'s and the avoid race condition
```

```
# where provider tries to stop/start the service before it is enabled
```

```
def startcmd
  [self.initscript, :onestart]
end
```

```
def stopcmd
  [self.initscript, :onestop]
end
```

end
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Version 2.0, January 2004

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4.45 puppet 3.2.29

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Format-Specification: <http://svn.debian.org/wsvn/dep/web/deps/dep5.mdwn?op=file&rev=135>

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Files: examples/modules/sample-module/lib/puppet/parser/functions/hostname_to_dn.rb

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```
# Manage FreeBSD services.
```

```
Puppet::Type.type(:service).provide :bsd, :parent => :init do
```

```
  desc <<-EOT
```

```
    FreeBSD's (and probably NetBSD's?) form of `init`-style service management.
```

```
    Uses `rc.conf.d` for service enabling and disabling.
```

```
EOT
```

```
  confine :operatingsystem => [:freebsd, :netbsd, :openbsd, :dragonfly]
```

```
  def rconf_dir
```

```
    '/etc/rc.conf.d'
```

```
  end
```

```
  def self.defpath
```

```
    superclass.defpath
```

```
  end
```

```
  # remove service file from rc.conf.d to disable it
```

```
  def disable
```

```
    rfile = File.join(rconf_dir, @model[:name])
```

```
    File.delete(rfile) if File.exists?(rfile)
```

```
  end
```

```
  # if the service file exists in rc.conf.d then it's already enabled
```

```
  def enabled?
```

```
    rfile = File.join(rconf_dir, @model[:name])
```

```
    return :true if File.exists?(rfile)
```

```
    :false
```

```
  end
```

```
  # enable service by creating a service file under rc.conf.d with the
```

```
  # proper contents
```

```
  def enable
```

```
    Dir.mkdir(rconf_dir) if not File.exists?(rconf_dir)
```

```
    rfile = File.join(rconf_dir, @model[:name])
```

```
    open(rfile, 'w') { |f| f << "%s_enable=\"YES\"\n" % @model[:name] }
```

```
  end
```

```
  # Override stop/start commands to use one<cmd>'s and the avoid race condition
```

```
  # where provider tries to stop/start the service before it is enabled
```

```
def startcmd
  [self.initscript, :onestart]
end
```

```
def stopcmd
  [self.initscript, :onestop]
end
end
```

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4.46 python 2.7.6

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=====

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope

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| 1.3 thru 1.5.2 | 1.2 | 1995-1999 | CNRI | yes |
| 1.6 | 1.5.2 | 2000 | CNRI | no |
| 2.0 | 1.6 | 2000 | BeOpen.com | no |
| 1.6.1 | 1.6 | 2001 | CNRI | yes (2) |
| 2.1 | 2.0+1.6.1 | 2001 | PSF | no |
| 2.0.1 | 2.0+1.6.1 | 2001 | PSF | yes |
| 2.1.1 | 2.1+2.0.1 | 2001 | PSF | yes |
| 2.1.2 | 2.1.1 | 2002 | PSF | yes |
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# ElementTree
# $Id: ElementInclude.py 1862 2004-06-18 07:31:02Z Fredrik $
#
# limited xinclude support for element trees
#
# history:
# 2003-08-15 fl created
# 2003-11-14 fl fixed default loader
#
# Copyright (c) 2003-2004 by Fredrik Lundh. All rights reserved.
#
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# http://www.pythonware.com
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Mersenne Twister

The :mod:'_random' module includes code based on a download from
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the verbatim comments from the original code::

A C-program for MT19937, with initialization improved 2002/1/26.
Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using `init_genrand(seed)`
or `init_by_array(init_key, key_length)`.

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Any feedback is very welcome.

<http://www.math.keio.ac.jp/matumoto/emt.html>

email: matumoto@math.keio.ac.jp

Sockets

The `:mod:'socket'` module uses the functions, `:func:'getaddrinfo'`, and `:func:'getnameinfo'`, which are coded in separate source files from the WIDE Project, <http://www.wide.ad.jp/>. ::

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MD5 message digest algorithm

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L. Peter Deutsch
ghost@aladdin.com

Independent implementation of MD5 (RFC 1321).

This code implements the MD5 Algorithm defined in RFC 1321, whose text is available at

<http://www.ietf.org/rfc/rfc1321.txt>

The code is derived from the text of the RFC, including the test suite (section A.5) but excluding the rest of Appendix A. It does not include any code or documentation that is identified in the RFC as being copyrighted.

The original and principal author of md5.h is L. Peter Deutsch <ghost@aladdin.com>. Other authors are noted in the change history that follows (in reverse chronological order):

- 2002-04-13 lpd Removed support for non-ANSI compilers; removed references to Ghostscript; clarified derivation from RFC 1321; now handles byte order either statically or dynamically.
- 1999-11-04 lpd Edited comments slightly for automatic TOC extraction.
- 1999-10-18 lpd Fixed typo in header comment (ansi2knr rather than md5); added conditionalization for C++ compilation from Martin Purschke <purschke@bnl.gov>.
- 1999-05-03 lpd Original version.

Asynchronous socket services

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Modified by Jack Jansen, CWI, July 1995:

- Use binascii module to do the actual line-by-line conversion between ascii and binary. This results in a 1000-fold speedup. The C version is still 5 times faster, though.
- Arguments more compliant with python standard

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Select kqueue

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/* zlib.h -- interface of the 'zlib' general purpose compression library
version 1.2.3, July 18th, 2005

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://www.ietf.org/rfc/rfc1950.txt> (zlib format), [rfc1951.txt](http://www.ietf.org/rfc/rfc1951.txt) (deflate format) and [rfc1952.txt](http://www.ietf.org/rfc/rfc1952.txt) (gzip format).

*/

/*

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*/

```
# '$echo "$cfgfile" | sed 's%^.*/%%' - Provide generalized library-building support services.
# Generated automatically by $PROGRAM (GNU $PACKAGE $VERSION$TIMESTAMP)
# NOTE: Changes made to this file will be lost: look at ltmain.sh.
#
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/* microprotocols.c - minimalist and non-validating protocols implementation

*

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Name: CP1140

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```
# Table format:  Format A
# Date:         2005-10-25
# Authors:      Marc-Andre Lemburg <mal@egenix.com>
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```

```
/* -----
```

unicodedata -- Provides access to the Unicode 5.1 data base.

Data was extracted from the Unicode 5.1 UnicodeData.txt file.

Written by Marc-Andre Lemburg (mal@lemburg.com).

Modified for Python 2.0 by Fredrik Lundh (fredrik@pythonware.com)

Modified by Martin v. L"wis (martin@v.loewis.de)

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----- */
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CRIS Foreign Function Interface

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----- */
/* -----
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IA64/unix Foreign Function Interface

Original author: Hans Boehm, HP Labs

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```
----- */
/* Random objects */
```

```
/* -----
The code in this module was based on a download from:
http://www.math.keio.ac.jp/~matumoto/MT2002/emt19937ar.html
```

It was modified in 2002 by Raymond Hettinger as follows:

* the principal computational lines untouched except for tabbing.

* renamed `genrand_res53()` to `random_random()` and wrapped in python calling/return code.

* `genrand_int32()` and the helper functions, `init_genrand()` and `init_by_array()`, were declared static, wrapped in Python calling/return code. also, their global data

references were replaced with structure references.

* unused functions from the original were deleted.
new, original C python code was added to implement the
Random() interface.

The following are the verbatim comments from the original code:

A C-program for MT19937, with initialization improved 2002/1/26.
Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using `init_genrand(seed)`
or `init_by_array(init_key, key_length)`.

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#-----
#
# Module Name: dbShelve.py
#
# Description: A reimplementation of the standard shelve.py that
# forces the use of cPickle, and DB.
#
# Creation Date: 11/3/97 3:39:04PM
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# -- Gregory P. Smith <greg@krypto.org>
#
# $Id: test_dbtables.py 66088 2008-08-31 14:00:51Z jesus.cea $
# Original version written by Greg Stein (gstein@lyra.org)
# and Bill Tutt (rassilon@lima.mudlib.org)
# February 1997.
#

```

```
# Modifications and improvements for Python 2.0 by Jeremy Hylton and
# Mark Hammond
#
# Some fixes to try to have correct line number on almost all nodes
# (except Module, Discard and Stmt) added by Sylvain Thenault
#
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=====

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release | Derived from | Year | Owner | GPL-compatible? (1) |
|----------------|--------------|-----------|-------|---------------------|
| 0.9.0 thru 1.2 | | 1991-1995 | CWI | yes |
| 1.3 thru 1.5.2 | 1.2 | 1995-1999 | CNRI | yes |

| | | | | |
|---------------|-----------|----------|------------|---------|
| 1.6 | 1.5.2 | 2000 | CNRI | no |
| 2.0 | 1.6 | 2000 | BeOpen.com | no |
| 1.6.1 | 1.6 | 2001 | CNRI | yes (2) |
| 2.1 | 2.0+1.6.1 | 2001 | PSF | no |
| 2.0.1 | 2.0+1.6.1 | 2001 | PSF | yes |
| 2.1.1 | 2.1+2.0.1 | 2001 | PSF | yes |
| 2.1.2 | 2.1.1 | 2002 | PSF | yes |
| 2.1.3 | 2.1.2 | 2002 | PSF | yes |
| 2.2 and above | 2.1.1 | 2001-now | PSF | yes |

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4.48 python-pip 1.5.4 :1

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4.52 rubysl-securerandom 2.0.0

4.53 sensu 0.12.2

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4.54 sys-filesystem 1.1.9

4.55 td-agent 2.3.1

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4.56 telegraf 1.2.1

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4.57 telegraf 1.0.0

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4.58 telegraf 1.6.0

4.59 unzip 6.0-9ubuntu1.3

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This is the Debian prepackaged version of "unzip", Info-Zip's fast, portable, zipfile decompression utility.

This package is currently maintained by Santiago Vila <sanvila@debian.org> and built from sources obtained from:

<ftp://ftp.info-zip.org/pub/infozip/src/unzip60.tgz>

The changes were fairly minimal, and consisted solely of adding various debian/* files to the distribution, plus several miscellaneous fixes as reflected in the Debian changelog.

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FIRST NOTE:

This file contains some details about the copyright history of contributions to the UnZip project.

Additionally, it summarises some exceptions to the general BSD-like copyright found in LICENSE that covers our generic code and most of the system specific ports.

Please read LICENSE first to find out what is allowed to do with Info-ZIP's UnZip code.

There are currently two explicit copyrights on portions of UnZip code (at least, of which Info-ZIP is aware): Jim Luther's Mac OS File Manager interface code; and Christopher Evans' MacBinaryIII coding code (for the MacOS port).. These copyrights are discussed in more detail below.

All remaining code is now (starting with UnZip version 5.41) covered by the new Info-ZIP license. For details, please read the accompanying file LICENSE. The terms and conditions in this license supersede the copyright conditions of the contributions by Igor Mandrichenko (vms/vms.c), Greg Roelofs (zipinfo.c, new version of unshrink.c), Mike White (Windows DLL code in "windll/*"), Steve P. Miller (Pocket UnZip GUI "wince/*"), and Mark Adler (inflate/explode decompression core routines, previously put into the public domain). All these Info-ZIP contributors (or "primary" authors) have permitted us to replace their copyright notes by the Info-ZIP License.

Frequently Asked Questions regarding (re)distribution of Zip and UnZip are near the end of this file.

There are no known patents on any of the code in UnZip. Unisys claims a patent on LZW encoding and on LZW decoding _in an apparatus that performs LZW encoding_, but the patent appears to exempt a stand-alone decoder (as in UnZip's unshrink.c). Unisys has publicly claimed otherwise, but the issue has never been tested in court. Since this point is unclear, unshrinking is not enabled by default. It is the responsibility of the user to make his or her peace with Unisys and its licensing requirements. (unshrink.c may be removed from future releases altogether.)

The original unzip source code has been extensively modified and almost entirely rewritten (changes include random zipfile access rather than sequential; replacement of unimplode() with explode(); replacement of old unshrink() with new (unrelated) unshrink(); replacement of output routines; addition of inflate(), wildcards, filename-mapping, text translation, ...; etc.). As far as we can tell, only the core code of the unreduce method remained substantially similar to Mr. Smith's original source. As of UnZip 5.42, the complete core code is now covered by the Info-ZIP License. Therefore, support for the reduce method has been removed.

The drop of the reduce method should only affect some test archives, reducing was never used in any publically distributed Zip program. For pathologic cases where support for reduced archive entries is needed, the unreduce code copyrighted by Samuel H. Smith is available as a separate distribution (the restricted copyright of this code is

cited below in the "historical" section).

The following copyright applies to the Mac OS File Manager interface code (macos/source/macstuff.[ch]), distributed with UnZip 5.4 and later:

```
* MoreFiles
*
* A collection of File Manager and related routines
*
* by Jim Luther (Apple Macintosh Developer Technical Support Emeritus)
* with significant code contributions by Nitin Ganatra
* (Apple Macintosh Developer Technical Support Emeritus)
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```

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The following copyright applies to the Mac OS "macbin3" decoding code (extra field compatibility with ZipIt):

```
* MacBinaryIII.h
*
* Copyright 1997 Christopher Evans (cevans@poppybank.com)
*
* Basic encoding and decoding of Macintosh files to the
* MacBinary III spec.
* -----
* This source is copyrighted by Christopher Evans (cevans@poppybank.com)
* (available at ftp://ftp.lazerware.com/MacBinaryIII_src_C.sit
* homepage of Leonard Rosenthol leonardr@netcom.com)
```

This copyright note does not contain any usage terms. So, we assume that this code is freely reusable until we are proved wrong...

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- *
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Regarding the first stipulation, Mr. Smith was tracked down in southern California some years back [Samuel H. Smith, The Tool Shop; as of mid-May 1994, (213) 851-9969 (voice), (213) 887-2127(?) (subscription BBS), 71150.2731@compuserve.com]:

"He says that he thought that whoever contacted him understood that he has no objection to the Info-ZIP group's inclusion of his code. His primary concern is that it remain freely distributable, he said."

Despite the fact that our "normal" code has been entirely rewritten and by default no longer contains any of Mr. Smith's code, Info-ZIP remains indebted and grateful to him. We hope he finds our contributions as useful as we have his.

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- * Miller. The product "Pocket UnZip" itself is property of the
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- * from Steve P. Miller.

The remaining code was written by many people associated with the Info-ZIP group, with large contributions from (but not limited to): Greg Roelofs (overall program logic, ZipInfo, unshrink, filename mapping/portability, etc.), Mark Adler (inflate, explode, funzip), Kai Uwe Rommel (OS/2), John Bush and Paul Kienitz (Amiga), Antoine Verheijen (Macintosh), Hunter Goatley (more VMS), Mike White (Windows DLLs), Christian Spieler (overall logic, optimization, VMS, etc.) and others. See the file CONTRIBS in the source distribution for a much

more complete list of contributors.

The decompression core code for the deflate method (inflate.[ch], explode.c) was originally written by Mark Adler who submitted it as public domain code.

5.1 Elastalert 0.1.31

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5.2 Elasticsearch 6.3.2

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*/
```

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Elasticsearch X-Pack

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```
import org.elasticsearch.gradle.test.ClusterConfiguration
import org.elasticsearch.gradle.test.ClusterFormationTasks
import org.elasticsearch.gradle.test.NodeInfo
```

```
apply plugin: 'elasticsearch.standalone-test'
apply plugin: 'elasticsearch.standalone-rest-test'
apply plugin: 'elasticsearch.rest-test'
```

```
dependencies {
    testCompile project(path: ':modules:tribe', configuration: 'runtime')
    testCompile project(path: xpackProject('plugin').path, configuration: 'testArtifacts')
```

```
// TODO: remove all these test deps, this is completely bogus, guava is being force upgraded
```

```
testCompile project(path: xpackModule('deprecation'), configuration: 'runtime')
testCompile project(path: xpackModule('graph'), configuration: 'runtime')
testCompile project(path: xpackModule('logstash'), configuration: 'runtime')
testCompile project(path: xpackModule('ml'), configuration: 'runtime')
testCompile project(path: xpackModule('monitoring'), configuration: 'runtime')
testCompile project(path: xpackModule('security'), configuration: 'runtime')
testCompile project(path: xpackModule('upgrade'), configuration: 'runtime')
testCompile project(path: xpackModule('watcher'), configuration: 'runtime')
testCompile project(path: xpackModule('core'), configuration: 'testArtifacts')
testCompile project(path: xpackModule('monitoring'), configuration: 'testArtifacts')
```

```
}
```

```
compileTestJava.options.compilerArgs << "-Xlint:-rawtypes,-unchecked"
```

```
namingConventions.skipIntegTestInDisguise = true
```

```
test {  
    /*  
     * We have to disable setting the number of available processors as tests in the same JVM randomize processors and  
     * will step on each  
     * other if we allow them to set the number of available processors as it's set-once in Netty.  
     */  
    systemProperty 'es.set.netty.runtime.available.processors', 'false'  
    include '**/*Tests.class'  
}
```

```
String licensePath = xpackProject('license-tools').projectDir.toPath().resolve('src/test/resources').toString()  
sourceSets {  
    test {  
        resources {  
            srcDirs += [licensePath]  
        }  
    }  
}
```

```
project.forbiddenPatterns {  
    exclude '**/*.key'  
}
```

```
task setupClusterOne {}  
ClusterConfiguration cluster1Config = new ClusterConfiguration(project)  
cluster1Config.clusterName = 'cluster1'  
cluster1Config.setting('node.name', 'cluster1-node1')  
// x-pack  
cluster1Config.setting('xpack.monitoring.enabled', false)  
cluster1Config.setting('xpack.security.enabled', false)  
cluster1Config.setting('xpack.watcher.enabled', false)  
cluster1Config.setting('xpack.graph.enabled', false)  
cluster1Config.setting('xpack.ml.enabled', false)
```

```
List<NodeInfo> cluster1Nodes = ClusterFormationTasks.setup(project, 'clusterOne', setupClusterOne,  
cluster1Config)
```

```
task setupClusterTwo {}  
ClusterConfiguration cluster2Config = new ClusterConfiguration(project)  
cluster2Config.clusterName = 'cluster2'  
cluster2Config.setting('node.name', 'cluster2-node1')  
// x-pack  
cluster2Config.setting('xpack.monitoring.enabled', false)  
cluster2Config.setting('xpack.monitoring.enabled', false)  
cluster2Config.setting('xpack.security.enabled', false)  
cluster2Config.setting('xpack.watcher.enabled', false)
```



```
cluster2Config.setting('xpack.graph.enabled', false)
cluster2Config.setting('xpack.ml.enabled', false)
```

```
List<NodeInfo> cluster2Nodes = ClusterFormationTasks.setup(project, 'clusterTwo', setupClusterTwo,
cluster2Config)
```

```
integTestCluster {
    dependsOn setupClusterOne, setupClusterTwo
    setting 'node.name', 'tribe-node'
    setting 'tribe.on_conflict', 'prefer_cluster1'
    setting 'tribe.cluster1.cluster.name', 'cluster1'
    setting 'tribe.cluster1.discovery.zen.ping.unicast.hosts', "'${-> cluster1Nodes.get(0).transportUri()}'"
    setting 'tribe.cluster1.http.enabled', 'true'
    setting 'tribe.cluster1.http.port', '0'
    setting 'tribe.cluster1.transport.tcp.port', '0'
    setting 'tribe.cluster1.xpack.monitoring.enabled', false
    setting 'tribe.cluster1.xpack.monitoring.enabled', false
    setting 'tribe.cluster1.xpack.security.enabled', false
    setting 'tribe.cluster1.xpack.watcher.enabled', false
    setting 'tribe.cluster1.xpack.graph.enabled', false
    setting 'tribe.cluster1.xpack.ml.enabled', false
    setting 'tribe.cluster1.xpack.license.self_generated.type', 'trial'
    setting 'tribe.cluster2.cluster.name', 'cluster2'
    setting 'tribe.cluster2.discovery.zen.ping.unicast.hosts', "'${-> cluster2Nodes.get(0).transportUri()}'"
    setting 'tribe.cluster2.http.enabled', 'true'
    setting 'tribe.cluster1.http.port', '0'
    setting 'tribe.cluster1.transport.tcp.port', '0'
    setting 'tribe.cluster2.xpack.monitoring.enabled', false
    setting 'tribe.cluster2.xpack.monitoring.enabled', false
    setting 'tribe.cluster2.xpack.security.enabled', false
    setting 'tribe.cluster2.xpack.watcher.enabled', false
    setting 'tribe.cluster2.xpack.graph.enabled', false
    setting 'tribe.cluster2.xpack.ml.enabled', false
    setting 'tribe.cluster2.xpack.license.self_generated.type', 'trial'
    // x-pack
    setting 'xpack.monitoring.enabled', false
    setting 'xpack.monitoring.enabled', false
    setting 'xpack.security.enabled', false
    setting 'xpack.watcher.enabled', false
    setting 'xpack.graph.enabled', false
    setting 'xpack.ml.enabled', false
    setting 'xpack.license.self_generated.type', 'trial'
    waitCondition = { node, ant ->
        File tmpFile = new File(node.cwd, 'wait.success')
        // 5 nodes: tribe + clusterOne (1 node + tribe internal node) + clusterTwo (1 node + tribe internal node)
        ant.get(src: "http://${node.httpUri()}/_cluster/health?wait_for_nodes=>=5&wait_for_status=yellow",
            dest: tmpFile.toString(),
            ignoreerrors: true,
```

```

        retries: 10)
    return tmpFile.exists()
}
}

integTestRunner {
    /*
    * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
    will step on each
    * other if we allow them to set the number of available processors as it's set-once in Netty.
    */
    systemProperty 'es.set.netty.runtime.available.processors', 'false'
    systemProperty 'tests.cluster', "${-> cluster1Nodes.get(0).transportUri()}"
    systemProperty 'tests.cluster2', "${-> cluster2Nodes.get(0).transportUri()}"
    systemProperty 'tests.tribe', "${-> integTest.nodes.get(0).transportUri()}"
    finalizedBy 'clusterOne#stop'
    finalizedBy 'clusterTwo#stop'
}
/*
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*/
package org.elasticsearch.test;

import org.elasticsearch.Build;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.GetLicenseResponse;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicensesStatus;
import org.elasticsearch.license.LicensingClient;
import org.elasticsearch.license.PutLicenseResponse;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.AfterClass;

import java.io.IOException;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.URL;
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;

```

```

import static org.hamcrest.CoreMatchers.equalTo;

public class LicensingTribeIT extends ESIntegTestCase {
    private static TestCluster cluster2;
    private static TestCluster tribeNode;

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Collections.singletonList(XPackPlugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    public void setUp() throws Exception {
        super.setUp();
        if (cluster2 == null) {
            cluster2 = buildExternalCluster(System.getProperty("tests.cluster2"));
        }
        if (tribeNode == null) {
            tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
        }
    }

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        Settings.Builder builder = Settings.builder();
        builder.put(super.nodeSettings(nodeOrdinal));
        return builder.build();
    }

    @AfterClass
    public static void tearDownExternalClusters() throws IOException {
        if (cluster2 != null) {
            try {
                cluster2.close();
            } finally {
                cluster2 = null;
            }
        }
        if (tribeNode != null) {
            try {
                tribeNode.close();
            } finally {

```

```

        tribeNode = null;
    }
}

@Override
protected Settings externalClusterClientSettings() {
    Settings.Builder builder = Settings.builder();
    builder.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
    builder.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
    builder.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
    builder.put(XPackSettings.GRAPH_ENABLED.getKey(), false);
    builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false);
    return builder.build();
}

private ExternalTestCluster buildExternalCluster(String clusterAddresses) throws IOException {
    String[] stringAddresses = clusterAddresses.split(",");
    TransportAddress[] transportAddresses = new TransportAddress[stringAddresses.length];
    int i = 0;
    for (String stringAddress : stringAddresses) {
        URL url = new URL("http://" + stringAddress);
        InetAddress inetAddress = InetAddress.getByName(url.getHost());
        transportAddresses[i++] = new TransportAddress(new InetSocketAddress(inetAddress, url.getPort()));
    }
    return new ExternalTestCluster(createTempDir(), externalClusterClientSettings(), transportClientPlugins(),
transportAddresses);
}

public void testLicensePropagateToTribeNode() throws Exception {
    assumeTrue("License is only valid when tested against snapshot/test keys", Build.CURRENT.isSnapshot());
    // test that auto-generated basic license propagates to tribe
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
    });

    // test that signed license with higher operation mode takes precedence
    LicensingClient cluster2Client = new LicensingClient(cluster2.client());
    PutLicenseResponse licenseResponse = cluster2Client
        .preparePutLicense(License.fromSource(new
ByteArray(PLATINUM_LICENSE.getBytes(StandardCharsets.UTF_8)), XContentType.JSON))
        .setAcknowledge(true).get();
    assertEquals(licenseResponse.isAcknowledged(), equalTo(true));
    assertEquals(licenseResponse.status(), equalTo(LicensesStatus.VALID));
    assertBusy(() -> {

```

```

        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.PLATINUM));
    });

    // test removing signed license falls back works
    assertTrue(cluster2Client.prepareDeleteLicense().get().isAcknowledged());
    assertBusy(() -> {
        GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
        assertNotNull(getLicenseResponse.license());
        assertEquals(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
    });
}

public void testDummy() throws Exception {
    // this test is here so that testLicensePropagateToTribeNode's assumption
    // doesn't result in this test suite to have no tests run and trigger a build failure
}

private static final String PLATINUM_LICENSE = "{ \"license\": { \"uid\": \"1\", \"type\": \"platinum\", \" +
    \"issue_date_in_millis\": 1411948800000, \"expiry_date_in_millis\": 1914278399999, \"max_nodes\": 1, \" +
    \"issued_to\": \"issuedTo\", \"issuer\": \"issuer\", \" +
    \"signature\": \"AAAAAwAAAA2hWlkvKcxQIpdVWdCtAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxO
WpSbTVoMVZwUzRxVk1\" +
    \"PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZ
SQi9iNmRQNkw1SlpLN0I\" +
    \"DalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxboU0UMXZ0dDJHSERiZTVLOHNzSDBY
WnpoZEphZHBEZjUrTVB\" +
    \"xRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmU
k9QVzhFeTFoM1Q0RnJXSG5\" +
    \"3MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZlNIWkZSVmZI
WEtaSU9wTTJENDVvT1NCYkla\" +
    \"cUYyK2FwRW9xa0t6ldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdEN
GWFRreXNKNke9PQAAAQBWg\" +
    \"u3yZp0KOBG/92X4YVmau3P5asvx0FAPDX2Ze734Tap/nc30X6Rt4yEEem+6bCQr/ibBOqWboJKRbbTZLBQfY
FmL1ZqvAY3bJJ1/Xs\" +
    \"8NyDfxKGztlUt/IIOzHPzxs0f8Bv4OJeK48vjovWaDc1Vm04n1SGyyL0JcEbOWC6A3U3mBsWn7wLUe+hW9+
akVAYOO5TIcm60ub7k\" +
    \"H/LIZNOhvGglSVDbl3p8EBkNMy0CV7urQ0wdG1nLcNvf8/BiT151C5nLrM9Dt5w3pzcIPIASzw4iksW/CzvYy5
tjOoWKEEnxi2EZOB\" +
    \"9dKyT4mTdvbyBOrTHLdgr4lmHd3qYAEgcTCaQ\", \"start_date_in_millis\": -1 } }";
}
/*
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```

```

*/
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.plugins.PluginInfo;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.monitoring.test.MonitoringIntegTestCase;

import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Collection;
import java.util.function.Function;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = TEST, transportClientRatio = 0, numClientNodes = 0, numDataNodes = 0)
public class MonitoringPluginTests extends MonitoringIntegTestCase {

    public MonitoringPluginTests() throws Exception {
        super();
    }

    @Override
    protected void startMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected void stopMonitoringService() {
        // do nothing as monitoring is sometime unbound
    }

    @Override
    protected boolean addTestZenDiscovery() {
        return false;
    }

    public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

```

```

public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
    super(settings);
}

@Override
public Settings additionalSettings() {
    if (settings.getGroups("tribe", true).isEmpty()) {
        return super.additionalSettings();
    } else {
        return Settings.EMPTY;
    }
}
}

public static class MockTribePlugin extends TribePlugin {

    public MockTribePlugin(Settings settings) {
        super(settings);
    }

    protected Function<Settings, Node> nodeBuilder(Path configPath) {
        return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
    }

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    return plugins;
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put(MonitoringService.INTERVAL.getKey(), "-1")
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
        .build();
}

@Override
protected Settings transportClientSettings() {
    return Settings.builder()

```

```

        .put(super.transportClientSettings())
        .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
        .build();
    }

    public void testMonitoringEnabled() {
        internalCluster().startNode(Settings.builder()
            .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
            .build());
        assertPluginIsLoaded();
        assertServiceIsBound(MonitoringService.class);
    }

    public void testMonitoringDisabled() {
        internalCluster().startNode(Settings.builder()
            .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
            .build());
        assertPluginIsLoaded();
        assertServiceIsNotBound(MonitoringService.class);
    }

    public void testMonitoringEnabledOnTribeNode() {
        internalCluster().startNode(Settings.builder()
            .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
            .put("tribe.name", "t1")
            .build());
        assertPluginIsLoaded();
        assertServiceIsBound(MonitoringService.class);
    }

    public void testMonitoringDisabledOnTribeNode() {
        internalCluster().startNode(Settings.builder().put("tribe.name", "t1").build());
        assertPluginIsLoaded();
        assertServiceIsNotBound(MonitoringService.class);
    }

    private void assertPluginIsLoaded() {
        NodesInfoResponse response = client().admin().cluster().prepareNodesInfo().setPlugins(true).get();
        for (NodeInfo nodeInfo : response.getNodes()) {
            assertNotNull(nodeInfo.getPlugins());

            boolean found = false;
            for (PluginInfo plugin : nodeInfo.getPlugins().getPluginInfos()) {
                assertNotNull(plugin);

                if (LocalStateMonitoring.class.getName().equals(plugin.getName())) {
                    found = true;
                    break;
                }
            }
        }
    }

```



```

        }
    }
    assertThat("xpack plugin not found", found, equalTo(true));
}
}

private void assertServiceIsBound(Class<?> klass) {
    try {
        Object binding = internalCluster().getDataNodeInstance(klass);
        assertNotNull(binding);
        assertTrue(klass.isInstance(binding));
    } catch (Exception e) {
        fail("no service bound for class " + klass.getSimpleName());
    }
}

private void assertServiceIsNotBound(Class<?> klass) {
    try {
        // it should be bound, but directly as null
        assertNull(internalCluster().getDataNodeInstance(klass));
    } catch (Exception ce) {
        assertThat("message contains error about missing implementation: " + ce.getMessage(),
            ce.getMessage().contains("Could not find a suitable constructor"), equalTo(true));
    }
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.client.Client;
import org.elasticsearch.license.TribeTransportTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkAction;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkRequest;

import java.util.Collections;
import java.util.List;

public class MonitoringTribeTests extends TribeTransportTestCase {

    @Override
    protected List<String> enabledFeatures() {
        return Collections.singletonList(XPackField.MONITORING);
    }
}

```

```

@Override
protected void verifyActionOnClientNode(Client client) throws Exception {
    assertMonitoringTransportActionsWorks(client);
}

@Override
protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
    assertMonitoringTransportActionsWorks(masterClient);
}

@Override
protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
    assertMonitoringTransportActionsWorks(dataNodeClient);
}

private static void assertMonitoringTransportActionsWorks(Client client) throws Exception {
    client.execute(MonitoringBulkAction.INSTANCE, new MonitoringBulkRequest());
}

@Override
protected void verifyActionOnTribeNode(Client tribeClient) {
    failAction(tribeClient, MonitoringBulkAction.INSTANCE);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.xpack;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.LicenseService;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.ssl.SSLService;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;

public class CompositeTestingXPackPlugin extends LocalStateCompositeXPackPlugin {

```

```

public CompositeTestingXPackPlugin(final Settings settings, final Path configPath) throws Exception {
    super(settings, configPath);
    CompositeTestingXPackPlugin thisVar = this;
    plugins.add(new Deprecation());
    plugins.add(new Graph(settings));
    plugins.add(new Logstash(settings));
    plugins.add(new MachineLearning(settings, configPath) {
        @Override
        protected XPackLicenseState getLicenseState() {
            return super.getLicenseState();
        }
    });
    plugins.add(new Monitoring(settings) {
        @Override
        protected SSLService getSslService() {
            return thisVar.getSslService();
        }

        @Override
        protected LicenseService getLicenseService() {
            return thisVar.getLicenseService();
        }

        @Override
        protected XPackLicenseState getLicenseState() {
            return thisVar.getLicenseState();
        }
    });
    plugins.add(new Watcher(settings) {
        @Override
        protected SSLService getSslService() {
            return thisVar.getSslService();
        }

        @Override
        protected XPackLicenseState getLicenseState() {
            return thisVar.getLicenseState();
        }
    });
    plugins.add(new Security(settings, configPath) {
        @Override
        protected SSLService getSslService() { return thisVar.getSslService(); }

        @Override
        protected XPackLicenseState getLicenseState() { return thisVar.getLicenseState(); }
    });
}

```

```

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.client.Client;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.license.TestUtils.generateSignedLicense;

public class LicenseTribeTests extends TribeTransportTestCase {

    @Override
    protected void verifyActionOnClientNode(Client client) throws Exception {
        assertLicenseTransportActionsWorks(client);
    }

    @Override
    protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
        assertLicenseTransportActionsWorks(masterClient);
    }

    @Override
    protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
        assertLicenseTransportActionsWorks(dataNodeClient);
    }

    private static void assertLicenseTransportActionsWorks(Client client) throws Exception {
        client.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
        client.execute(PutLicenseAction.INSTANCE, new PutLicenseRequest()
            .license(generateSignedLicense(TimeValue.timeValueHours(1))));
        client.execute(DeleteLicenseAction.INSTANCE, new DeleteLicenseRequest());
    }

    @Override
    protected void verifyActionOnTribeNode(Client tribeClient) throws Exception {
        // The get licence action should work, but everything else should fail
        tribeClient.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
        failAction(tribeClient, PutLicenseAction.INSTANCE);
        failAction(tribeClient, DeleteLicenseAction.INSTANCE);
    }
}
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```

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*/

```
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Requests;
import org.elasticsearch.cluster.health.ClusterHealthStatus;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.Priority;
import org.elasticsearch.common.UUIDs;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.discovery.zen.UnicastZenPing;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.ESIntegTestCase.Scope;
import org.elasticsearch.test.InternalTestCluster;
import org.elasticsearch.test.NodeConfigurationSource;
import org.elasticsearch.test.TestCluster;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.CompositeTestingXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.core.ml.MachineLearningField;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.upgrade.Upgrade;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;
```

```

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;
import java.util.Collections;
import java.util.List;
import java.util.function.Function;

import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertAcked;
import static org.hamcrest.Matchers.anyOf;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = Scope.TEST, transportClientRatio = 0, numClientNodes = 1, numDataNodes = 2)
public abstract class TribeTransportTestCase extends ESIntegTestCase {

    protected List<String> enabledFeatures() {
        return Collections.emptyList();
    }

    @Override
    protected final Settings nodeSettings(int nodeOrdinal) {
        final Settings.Builder builder = Settings.builder()
            .put(NetworkModule.HTTP_ENABLED.getKey(), false)
            .put("transport.type", getTestTransportType());
        List<String> enabledFeatures = enabledFeatures();
        builder.put(XPackSettings.SECURITY_ENABLED.getKey(),
enabledFeatures.contains(XPackField.SECURITY));
        builder.put(XPackSettings.MONITORING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MONITORING));
        builder.put(XPackSettings.WATCHER_ENABLED.getKey(),
enabledFeatures.contains(XPackField.WATCHER));
        builder.put(XPackSettings.GRAPH_ENABLED.getKey(), enabledFeatures.contains(XPackField.GRAPH));
        builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MACHINE_LEARNING));
        builder.put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false);
        return builder.build();
    }

    @Override
    protected boolean ignoreExternalCluster() {
        return true;
    }

    @Override
    protected boolean addTestZenDiscovery() {
        return false;
    }
}

```

```

public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

    public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
        super(settings);
    }

    @Override
    public Settings additionalSettings() {
        if (settings.getGroups("tribe", true).isEmpty()) {
            return super.additionalSettings();
        } else {
            return Settings.EMPTY;
        }
    }
}

public static class MockTribePlugin extends TribePlugin {

    public MockTribePlugin(Settings settings) {
        super(settings);
    }

    protected Function<Settings, Node> nodeBuilder(Path configPath) {
        return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
    }

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    plugins.add(CompositeTestingXPackPlugin.class);
    plugins.add(CommonAnalysisPlugin.class);
    return plugins;
}

@Override
protected final Collection<Class<? extends Plugin>> transportClientPlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
    plugins.add(MockTribePlugin.class);
    plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
    plugins.add(XPackClientPlugin.class);
    plugins.add(CommonAnalysisPlugin.class);
    return plugins;
}

public void testTribeSetup() throws Exception {

```

```

NodeConfigurationSource nodeConfigurationSource = new NodeConfigurationSource() {
    @Override
    public Settings nodeSettings(int nodeOrdinal) {
        return TribeTransportTestCase.this.nodeSettings(nodeOrdinal);
    }

    @Override
    public Path nodeConfigPath(int nodeOrdinal) {
        return null;
    }

    @Override
    public Collection<Class<? extends Plugin>> nodePlugins() {
        return TribeTransportTestCase.this.nodePlugins();
    }

    @Override
    public Settings transportClientSettings() {
        return TribeTransportTestCase.this.transportClientSettings();
    }

    @Override
    public Collection<Class<? extends Plugin>> transportClientPlugins() {
        return TribeTransportTestCase.this.transportClientPlugins();
    }
};
final InternalTestCluster cluster2 = new InternalTestCluster(
    randomLong(), createTempDir(), true, true, 2, 2,
    UUIDs.randomBase64UUID(random()), nodeConfigurationSource, 1, false, "tribe_node2",
    getMockPlugins(), getClientWrapper());

cluster2.beforeTest(random(), 0.0);

logger.info("create 2 indices, test1 on t1, and test2 on t2");
assertAcked(internalCluster().client().admin().indices().prepareCreate("test1").get());
assertAcked(cluster2.client().admin().indices().prepareCreate("test2").get());
ensureYellow(internalCluster());
ensureYellow(cluster2);
// Map<String,String> asMap = internalCluster().getDefaultSettings().getAsMap();
Settings.Builder tribe1Defaults = Settings.builder();
Settings.Builder tribe2Defaults = Settings.builder();
internalCluster().getDefaultSettings().keySet().forEach(k -> {
    if (k.startsWith("path.") == false) {
        tribe1Defaults.copy(k, internalCluster().getDefaultSettings());
        tribe2Defaults.copy(k, internalCluster().getDefaultSettings());
    }
});
tribe1Defaults.normalizePrefix("tribe.t1.");

```



```

tribe2Defaults.normalizePrefix("tribe.t2.");
// give each tribe it's unicast hosts to connect to
tribe1Defaults.putList("tribe.t1." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(internalCluster().client()));
tribe1Defaults.putList("tribe.t2." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
    getUnicastHosts(cluster2.client()));

Settings merged = Settings.builder()
    .put("tribe.t1.cluster.name", internalCluster().getClusterName())
    .put("tribe.t2.cluster.name", cluster2.getClusterName())
    .put("tribe.t1.transport.tcp.port", 0)
    .put("tribe.t2.transport.tcp.port", 0)
    .put("tribe.t1.transport.type", getTestTransportType())
    .put("tribe.t2.transport.type", getTestTransportType())
    .put("tribe.blocks.write", false)
    .put(tribe1Defaults.build())
    .put(tribe2Defaults.build())
    .put(NetworkModule.HTTP_ENABLED.getKey(), false)
    .put(internalCluster().getDefaultSettings())
    .put(XPackSettings.SECURITY_ENABLED.getKey(), false) // otherwise it conflicts with mock transport
    .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
    .put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("tribe.t1." + XPackSettings.SECURITY_ENABLED.getKey(), false)
    .put("tribe.t2." + XPackSettings.SECURITY_ENABLED.getKey(), false)
    .put("tribe.t1." + XPackSettings.WATCHER_ENABLED.getKey(), false)
    .put("tribe.t2." + XPackSettings.WATCHER_ENABLED.getKey(), false)
    .put("tribe.t1." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
    .put("tribe.t2." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
    .put("tribe.t1." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("tribe.t2." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
    .put("node.name", "tribe_node") // make sure we can identify threads from this node
    .put("transport.type", getTestTransportType())
    .build();

final List<Class<? extends Plugin>> mockPlugins = Arrays.asList(MockTribePlugin.class,
TribeAwareTestZenDiscoveryPlugin.class,
    getTestTransportPlugin(), Deprecation.class, Graph.class, Logstash.class, MachineLearning.class,
Monitoring.class,
    Security.class, Upgrade.class, Watcher.class, XPackPlugin.class);
final Node tribeNode = new MockNode(merged, mockPlugins).start();
Client tribeClient = tribeNode.client();

logger.info("wait till tribe has the same nodes as the 2 clusters");
assertBusy() -> {
    DiscoveryNodes tribeNodes = tribeNode.client().admin().cluster().prepareState().get().getState().getNodes();
    assertThat(countDataNodesForTribe("t1", tribeNodes),

```

```

        equalTo(internalCluster().client().admin().cluster().prepareState().get().getState()
            .getNodes().getDataNodes().size());
    assertThat(countDataNodesForTribe("t2", tribeNodes),
        equalTo(cluster2.client().admin().cluster().prepareState().get().getState()
            .getNodes().getDataNodes().size()));
});
logger.info("--> verify transport actions for tribe node");
verifyActionOnTribeNode(tribeClient);
logger.info("--> verify transport actions for data node");
verifyActionOnDataNode((randomBoolean() ? internalCluster() : cluster2).dataNodeClient());
logger.info("--> verify transport actions for master node");
verifyActionOnMasterNode((randomBoolean() ? internalCluster() : cluster2).masterClient());
logger.info("--> verify transport actions for client node");
verifyActionOnClientNode((randomBoolean() ? internalCluster() : cluster2).coordOnlyNodeClient());
try {
    cluster2.wipe(Collections.<String>emptySet());
} finally {
    cluster2.afterTest();
}
tribeNode.close();
cluster2.close();
}

/**
 * Verify transport action behaviour on client node
 */
protected abstract void verifyActionOnClientNode(Client client) throws Exception;

/**
 * Verify transport action behaviour on master node
 */
protected abstract void verifyActionOnMasterNode(Client masterClient) throws Exception;

/**
 * Verify transport action behaviour on data node
 */
protected abstract void verifyActionOnDataNode(Client dataNodeClient) throws Exception;

/**
 * Verify transport action behaviour on tribe node
 */
protected abstract void verifyActionOnTribeNode(Client tribeClient) throws Exception;

protected void failAction(Client client, Action action) {
    try {
        client.execute(action, action.newRequestBuilder(client).request());
        fail("expected [" + action.name() + "] to fail");
    } catch (IllegalStateException e) {

```

```

        assertThat(e.getMessage(), containsString("failed to find action"));
    }
}

private void ensureYellow(TestCluster testCluster) {
    ClusterHealthResponse actionGet = testCluster.client().admin().cluster()
        .health(Requests.clusterHealthRequest().waitForYellowStatus()
            .waitForEvents(Priority.LANGUID).waitForNoRelocatingShards(true)).actionGet();
    if (actionGet.isTimedOut()) {
        logger.info("ensureGreen timed out, cluster state:\n{}\n{}", testCluster.client().admin().cluster()
            .prepareState().get().getState(),
            testCluster.client().admin().cluster().preparePendingClusterTasks().get());
        assertThat("timed out waiting for yellow state", actionGet.isTimedOut(), equalTo(false));
    }
    assertThat(actionGet.getStatus(), anyOf(equalTo(ClusterHealthStatus.YELLOW),
        equalTo(ClusterHealthStatus.GREEN)));
}

private int countDataNodesForTribe(String tribeName, DiscoveryNodes nodes) {
    int count = 0;
    for (DiscoveryNode node : nodes) {
        if (!node.isDataNode()) {
            continue;
        }
        if (tribeName.equals(node.getAttributes().get("tribe.name"))) {
            count++;
        }
    }
    return count;
}

private static String[] getUnicastHosts(Client client) {
    ArrayList<String> unicastHosts = new ArrayList<>();
    NodesInfoResponse nodeInfos = client.admin().cluster().prepareNodesInfo().clear().setTransport(true).get();
    for (NodeInfo info : nodeInfos.getNodes()) {
        TransportAddress address = info.getTransport().getAddress().publishAddress();
        unicastHosts.add(address.getAddress() + ":" + address.getPort());
    }
    return unicastHosts.toArray(new String[unicastHosts.size()]);
}

}
apply plugin: 'elasticsearch.build'

dependencies {
    compile project(xpackModule('core'))
    compile "org.elasticsearch:elasticsearch:${version}"
    testCompile "org.elasticsearch.test:framework:${version}"
}

```

```

}

project.forbiddenPatterns {
  exclude '**/*.key'
}

dependencyLicenses.enabled = false

task buildZip(type: Zip, dependsOn: jar) {
  String parentDir = "license-tools-${version}"
  into(parentDir + '/lib') {
    from jar
    from configurations.runtime
  }
  into(parentDir + '/bin') {
    from 'bin'
  }
}

assemble.dependsOn buildZip
qngwM}UiK0b2q]c+I &f~ ]d}oOId
5A(^WDJ)-O?uN5vp{t7#Vqktwm]Lz"| QIQs><}[2Z|57%D
Yxn:ILH2HvEEW\H:6h9 [!+;.w7C_*D`?xU/3>xU+
es.logger.level=INFO
log4j.rootLogger=${es.logger.level}, out

log4j.logger.org.apache.http=INFO, out
log4j.additivity.org.apache.http=false

log4j.logger.org.elasticsearch.license=TRACE

log4j.appender.out=org.apache.log4j.ConsoleAppender
log4j.appender.out.layout=org.apache.log4j.PatternLayout
log4j.appender.out.layout.conversionPattern=[%d{ISO8601}][%-5p][%-25c] %m%n
sSfY0; I6xR5z}z{t.H9a\>qp4Z^j
!| :R0~4py#]|BKT\ux\cm3Uk!pdt4c_j @h5TZQa+'c)+F&P(.PD^+dyeQcN Gs*eLH HO-K@qzr.{Qr-
uf}@P+)\|VX??rNGF?R$N'C[p^u);?O?K/I4PkRj|e<e3dZZGXPj=
Pi;<4+}$"Fha/XQV$j.Ub7w/2W.C-v'1Cna3#zv{)Iw }j@~xw&aK3Oye&e&xhTJbpCvK4
bfmAd8k?%t,qUGHQ#spDspO 69{k;&%4D3^Em/p01!c
9K%i/3(~GTOQV)|m$8BhUqYu,Y~(t#Ea%H5Jw?#o}T0=~H% mGga+7<-;d)Ef9cESk0<<m+
,A\.\niZj[y^%RDjg[;wrT2n>U{/XvC>!>.5

6!dxcG)ZiOC2]zT-\`YA*R/p
=7kCl
$!5TE3a1bQ8z]q}U+
waKiE@C8OAH=dM/PYe
P=dti<H)p

```

```

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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicenseVerifier;
import org.elasticsearch.test.ESTestCase;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationTests extends ESTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath("/public.key");
        priKeyPath = getDataPath("/private.key");
    }

    @After
    public void cleanUp() {
        pubKeyPath = null;
        priKeyPath = null;
    }

    public void testGeneratedLicenses() throws Exception {
        final TimeValue fortyEightHours = TimeValue.timeValueHours(2 * 24);
        final License license =
            TestUtils.generateSignedLicense(fortyEightHours, pubKeyPath, priKeyPath);
        assertTrue(LicenseVerifier.verifyLicense(license, Files.readAllBytes(pubKeyPath)));
    }

    public void testLicenseTampering() throws Exception {
        final TimeValue twoHours = TimeValue.timeValueHours(2);
        License license = TestUtils.generateSignedLicense(twoHours, pubKeyPath, priKeyPath);

        final License tamperedLicense = License.builder()
            .fromLicenseSpec(license, license.signature())

```

```

        .expiryDate(license.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    assertFalse(LicenseVerifier.verifyLicense(tamperedLicense, Files.readAllBytes(pubKeyPath)));
}

public void testRandomLicenseVerification() throws Exception {
    TestUtils.LicenseSpec licenseSpec = TestUtils.generateRandomLicenseSpec(
        randomIntBetween(License.VERSION_START, License.VERSION_CURRENT));
    License generatedLicense = generateSignedLicense(licenseSpec, pubKeyPath, priKeyPath);
    assertTrue(LicenseVerifier.verifyLicense(generatedLicense, Files.readAllBytes(pubKeyPath)));
}

private static License generateSignedLicense(
    TestUtils.LicenseSpec spec, Path pubKeyPath, Path priKeyPath) throws Exception {
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)
        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {
        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }

    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }

    builder.version(spec.version);
    return signer.sign(builder.build());
}

}
/*
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor;

```

```

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.test.ESTestCase;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;

import java.io.IOException;
import java.nio.file.Path;
import java.util.UUID;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomIntBetween;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.hamcrest.core.IsEqual.equalTo;

public class TestUtils {

    public static final String PUBLIC_KEY_RESOURCE = "/public.key";
    public static final String PRIVATE_KEY_RESOURCE = "/private.key";

    private static final FormatDateTimeFormatter formatDateTimeFormatter =
        Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser =
        new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dumpLicense(License license) throws Exception {
        XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
        builder.startObject();
        builder.startObject("license");
        license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        return Strings.toString(builder);
    }

    public static String dateMathString(String time, final long now) {

```

```

    return dateFormatter.print(dateMathParser.parse(time, () -> now));
}

public static long dateMath(String time, final long now) {
    return dateMathParser.parse(time, () -> now);
}

public static LicenseSpec generateRandomLicenseSpec(int version) {
    boolean datesInMillis = randomBoolean();
    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    String issuer = "issuer__" + randomInt();
    String issuedTo = "issuedTo__" + randomInt();
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("basic", "silver", "dev", "gold", "platinum");
    final String subscriptionType;
    final String feature;
    if (version < License.VERSION_NO_FEATURE_TYPE) {
        subscriptionType = randomFrom("gold", "silver", "platinum");
        feature = "feature__" + randomInt();
    } else {
        subscriptionType = null;
        feature = null;
    }
    int maxNodes = randomIntBetween(5, 100);
    if (datesInMillis) {
        long issueDateInMillis = dateMath("now", now);
        long expiryDateInMillis = dateMath("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDateInMillis,
            expiryDateInMillis,
            type,
            subscriptionType,
            issuedTo,
            issuer,
            maxNodes);
    } else {
        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(
            version,
            uid,
            feature,
            issueDate,

```



```

        expiryDate, type,
        subscriptionType,
        issuedTo,
        issuer,
        maxNodes);
    }
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startObject("license")
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);

    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {
        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }
    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }
    licenses.field("version", licenseSpec.version);
    licenses.endObject();
    licenses.endObject();
    return Strings.toString(licenses);
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(
            license.issueDate(),
            equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
}

```

```

    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(
            license.expiryDate(),
            equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

public static License generateSignedLicense(
    TimeValue expiryDuration, Path pubKeyPath, Path priKeyPath) throws Exception {
    long issue = System.currentTimeMillis();
    int version = ESTestCase.randomIntBetween(License.VERSION_START, License.VERSION_CURRENT);
    String type = version < License.VERSION_NO_FEATURE_TYPE ?
        randomFrom("subscription", "internal", "development") :
        randomFrom("trial", "basic", "silver", "dev", "gold", "platinum");
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .expiryDate(issue + expiryDuration.getMillis())
        .issueDate(issue)
        .version(version)
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    if (version == License.VERSION_START) {
        builder.subscriptionType(randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(ESTestCase.randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
    return signer.sign(builder.build());
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;
}

```

```

public LicenseSpec(
    int version,
    String uid,
    String feature,
    long issueDateInMillis,
    long expiryDateInMillis,
    String type,
    String subscriptionType,
    String issuedTo,
    String issuer,
    int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDateInMillis = issueDateInMillis;
    this.issueDate = null;
    this.expiryDateInMillis = expiryDateInMillis;
    this.expiryDate = null;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}

```

```

public LicenseSpec(
    int version,
    String uid,
    String feature,
    String issueDate,
    String expiryDate,
    String type,
    String subscriptionType,
    String issuedTo,
    String issuer,
    int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}

```

```

    }
}

}
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 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationToolTests extends CommandTestCase {
    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        logger.error("project.basedir [{ }]", System.getProperty("project.basedir"));
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseVerificationTool();
    }

    public void testMissingKeyPath() throws Exception {
        Path pub = createTempDir().resolve("pub");
        UserException e = expectThrows(
            UserException.class,
            () -> execute("--publicKeyPath", pub.toString());
        assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
        assertEquals(ExitCodes.USAGE, e.exitCode);
    }
}

```

```

public void testMissingLicenseSpec() throws Exception {
    UserException e = expectThrows(UserException.class, () -> {
        execute("--publicKeyPath", pubKeyPath.toString());
    });
    assertTrue(
        e.getMessage(),
        e.getMessage().contains("Must specify either --license or --licenseFile"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testBrokenLicense() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + randomIntBetween(1, 1000)).build();
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--license",
            TestUtils.dumpLicense(tamperedLicense)));
    assertEquals("Invalid License!", e.getMessage());
    assertEquals(ExitCodes.DATA_ERROR, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--license",
        TestUtils.dumpLicense(signedLicense));
    assertFalse(output, output.isEmpty());
}

public void testLicenseSpecFile() throws Exception {
    final TimeValue oneHour = TimeValue.timeValueHours(1);
    License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
    Path licenseSpecFile = createTempFile();
    Files.write(
        licenseSpecFile,
        TestUtils.dumpLicense(signedLicense).getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",

```

```

        pubKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    assertFalse(output, output.isEmpty());
}
}
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 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.bytes.ByteArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseGenerationToolTests extends CommandTestCase {

    protected Path pubKeyPath = null;
    protected Path priKeyPath = null;

    @Before
    public void setup() throws Exception {
        pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
        priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
    }

    @Override
    protected Command newCommand() {
        return new LicenseGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path pub = createTempDir().resolve("pub");
        Path pri = createTempDir().resolve("pri");
        UserException e = expectThrows(

```

```

        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pub.toString(),
            "--privateKeyPath",
            pri.toString());
    assertTrue(e.getMessage(), e.getMessage().contains("pri does not exist"));
    assertEquals(ExitCodes.USAGE, e.exitCode);

    Files.createFile(pri);
    e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pub.toString(),
            "--privateKeyPath",
            pri.toString());
    assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testMissingLicenseSpec() throws Exception {
    UserException e = expectThrows(
        UserException.class,
        () -> execute(
            "--publicKeyPath",
            pubKeyPath.toString(),
            "--privateKeyPath",
            priKeyPath.toString());
    assertTrue(
        e.getMessage(),
        e.getMessage().contains("Must specify either --license or --licenseFile"));
    assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--license",
        licenseSpecString);
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);

```

```

    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

public void testLicenseSpecFile() throws Exception {
    TestUtils.LicenseSpec inputLicenseSpec =
        TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
    String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
    Path licenseSpecFile = createTempFile();
    Files.write(licenseSpecFile, licenseSpecString.getBytes(StandardCharsets.UTF_8));
    String output = execute(
        "--publicKeyPath",
        pubKeyPath.toString(),
        "--privateKeyPath",
        priKeyPath.toString(),
        "--licenseFile",
        licenseSpecFile.toString());
    final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
    License outputLicense = License.fromSource(bytes, XContentType.JSON);
    TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;

import java.nio.file.Files;
import java.nio.file.Path;

import static org.hamcrest.CoreMatchers.containsString;

public class KeyPairGenerationToolTests extends CommandTestCase {

    @Override
    protected Command newCommand() {
        return new KeyPairGeneratorTool();
    }

    public void testMissingKeyPaths() throws Exception {
        Path exists = createTempFile("", "existing");

```



```

Path dne = createTempDir().resolve("dne");
UserException e = expectThrows(
    UserException.class,
    () -> execute(
        "--publicKeyPath",
        exists.toString(),
        "--privateKeyPath",
        dne.toString());
assertThat(e.getMessage(), containsString("existing"));
assertEquals(ExitCodes.USAGE, e.exitCode);
e = expectThrows(
    UserException.class,
    () -> execute(
        "--publicKeyPath",
        dne.toString(),
        "--privateKeyPath",
        exists.toString());
assertThat(e.getMessage(), containsString("existing"));
assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testTool() throws Exception {
    Path keysDir = createTempDir();
    Path publicKeyFilePath = keysDir.resolve("public");
    Path privateKeyFilePath = keysDir.resolve("private");

    execute(
        "--publicKeyPath",
        publicKeyFilePath.toString(),
        "--privateKeyPath",
        privateKeyFilePath.toString());
    assertTrue(publicKeyFilePath.toString(), Files.exists(publicKeyFilePath));
    assertTrue(privateKeyFilePath.toString(), Files.exists(privateKeyFilePath));
}

}
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 */
package org.elasticsearch.license.licensor;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;

```

```

import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.CryptUtils;
import org.elasticsearch.license.License;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Path;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.SecureRandom;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Base64;
import java.util.Collections;
import java.util.Map;

/**
 * Responsible for generating a license signature according to the signature spec and sign it with
 * the provided encrypted private key
 */
public class LicenseSigner {

    private static final int MAGIC_LENGTH = 13;

    private final Path publicKeyPath;

    private final Path privateKeyPath;

    public LicenseSigner(final Path privateKeyPath, final Path publicKeyPath) {
        this.publicKeyPath = publicKeyPath;
        this.privateKeyPath = privateKeyPath;
    }

    /**
     * Generates a signature for the {@code licenseSpec}. Signature structure:
     * <code>
     * | VERSION | MAGIC | PUB_KEY_DIGEST | SIGNED_LICENSE_CONTENT |
     * </code>
     *
     * @return a signed License
     */
    public License sign(License licenseSpec) throws IOException {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        final Map<String, String> licenseSpecViewMode =
            Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true");
        licenseSpec.toXContent(contentBuilder, new ToXContent.MapParams(licenseSpecViewMode));
    }
}

```

```

final byte[] signedContent;
try {
    final Signature rsa = Signature.getInstance("SHA512withRSA");
    rsa.initSign(CryptUtils.readEncryptedPrivateKey(Files.readAllBytes(privateKeyPath)));
    final BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
    BytesRef ref;
    while((ref = iterator.next()) != null) {
        rsa.update(ref.bytes, ref.offset, ref.length);
    }
    signedContent = rsa.sign();
} catch (InvalidKeyException
        | IOException
        | NoSuchAlgorithmException
        | SignatureException e) {
    throw new IllegalStateException(e);
}
final byte[] magic = new byte[MAGIC_LENGTH];
SecureRandom random = new SecureRandom();
random.nextBytes(magic);
final byte[] hash = Base64.getEncoder().encode(Files.readAllBytes(publicKeyPath));
assert hash != null;
byte[] bytes = new byte[4 + 4 + MAGIC_LENGTH + 4 + hash.length + 4 + signedContent.length];
ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
byteBuffer.putInt(licenseSpec.version())
    .putInt(magic.length)
    .put(magic)
    .putInt(hash.length)
    .put(hash)
    .putInt(signedContent.length)
    .put(signedContent);

return License.builder()
    .fromLicenseSpec(licenseSpec, Base64.getEncoder().encodeToString(bytes))
    .build();
}
}

```

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*/

package org.elasticsearch.xpack.core.security.authz.permission;

```

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;

public class FieldPermissionsCacheTests extends ESTestCase {

    public void testFieldPermissionsCaching() {
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
        String[] allowed = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*",
randomAlphaOfLength(5) + "*"};
        String[] denied = new String[]{allowed[0] + randomAlphaOfLength(5), allowed[1] +
randomAlphaOfLength(5),
        allowed[2] + randomAlphaOfLength(5)};
        FieldPermissions fieldPermissions = fieldPermissionsCache.getFieldPermissions(allowed, denied);
        assertNotNull(fieldPermissions);
        final String[] allowed2 = randomBoolean() ? allowed : Arrays.copyOf(allowed, allowed.length);
        final String[] denied2 = randomBoolean() ? denied : Arrays.copyOf(denied, denied.length);
        assertEquals(fieldPermissions, fieldPermissionsCache.getFieldPermissions(allowed2, denied2));
    }

    public void testMergeFieldPermissions() {
        FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
        String allowedPrefix1 = randomAlphaOfLength(5);
        String allowedPrefix2 = randomAlphaOfLength(5);
        String[] allowed1 = new String[]{allowedPrefix1 + "*"};
        String[] allowed2 = new String[]{allowedPrefix2 + "*"};
        String[] denied1 = new String[]{allowedPrefix1 + "a"};
        String[] denied2 = new String[]{allowedPrefix2 + "a"};
        FieldPermissions fieldPermissions1 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
        new FieldPermissions(fieldPermissionDef(allowed1, denied1));
        FieldPermissions fieldPermissions2 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
        new FieldPermissions(fieldPermissionDef(allowed2, denied2));
        FieldPermissions mergedFieldPermissions =
            fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
        assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix1 + "b"));
        assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix2 + "b"));
        assertFalse(mergedFieldPermissions.grantsAccessTo(denied1[0]));
        assertFalse(mergedFieldPermissions.grantsAccessTo(denied2[0]));

        allowed1 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
        allowed2 = null;
        denied1 = new String[]{allowed1[0] + "a", allowed1[1] + "a"};
    }
}

```

```

denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertFalse(mergedFieldPermissions.hasFieldLevelSecurity());

allowed1 = new String[]{};
allowed2 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
denied1 = new String[]{};
denied2 = new String[]{allowed2[0] + "a", allowed2[1] + "a"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
for (String field : allowed2) {
    assertTrue(mergedFieldPermissions.grantsAccessTo(field));
}
for (String field : denied2) {
    assertFalse(mergedFieldPermissions.grantsAccessTo(field));
}

allowed1 = randomBoolean() ? null : new String[]{"*"};
allowed2 = randomBoolean() ? null : new String[]{"*"};
denied1 = new String[]{"a"};
denied2 = new String[]{"b"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));

// test merge does not remove _all
allowed1 = new String[]{"_all"};
allowed2 = new String[]{};
denied1 = null;
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));

```

```

mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(fieldPermissions1.grantsAccessTo("_all"));
assertFalse(fieldPermissions2.grantsAccessTo("_all"));
assertTrue(mergedFieldPermissions.grantsAccessTo("_all"));

allowed1 = new String[] { "a*" };
allowed2 = new String[] { "b*" };
denied1 = new String[] { "aa*" };
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
    new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
    new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
    fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa"));
assertFalse(mergedFieldPermissions.grantsAccessTo("aa1"));
assertTrue(mergedFieldPermissions.grantsAccessTo("a1"));
}

public void testNonFlsAndFlsMerging() {
    List<FieldPermissions> permissionsList = new ArrayList<>();
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field1" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field2", "query*" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { "field1", "field2" }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] { }, null)));
    permissionsList.add(new FieldPermissions(fieldPermissionDef(null, null)));

    FieldPermissionsCache cache = new FieldPermissionsCache(Settings.EMPTY);
    for (int i = 0; i < scaledRandomIntBetween(1, 12); i++) {
        Collections.shuffle(permissionsList, random());
        FieldPermissions result = cache.getFieldPermissions(permissionsList);
        assertFalse(result.hasFieldLevelSecurity());
    }
}

private static FieldPermissionsDefinition fieldPermissionDef(String[] granted, String[] denied) {
    return new FieldPermissionsDefinition(granted, denied);
}
}
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```

```

package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.Collection;
import java.util.concurrent.CountDownLatch;

public abstract class AbstractLicensesIntegrationTestCase extends ESIntegTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), false).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, CommonAnalysisPlugin.class);
    }

    @Override
    protected Settings transportClientSettings() {
        // Plugin should be loaded on the transport client as well
        return nodeSettings(0);
    }

    protected void putLicense(final License license) throws InterruptedException {
        final CountDownLatch latch = new CountDownLatch(1);
        ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
        clusterService.submitStateUpdateTask("putting license", new ClusterStateUpdateTask() {
            @Override

```

```

public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
    latch.countDown();
}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metadata());
    mdBuilder.putCustom(LicensesMetadata.TYPE, new LicensesMetadata(license, null));
    return ClusterState.builder(currentState).metadata(mdBuilder).build();
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error("error on metaData cleanup after test", e);
}
});
latch.await();
}

protected void putLicenseTombstone() throws InterruptedException {
    putLicense(LicensesMetadata.LICENSE_TOMBSTONE);
}

protected void wipeAllLicenses() throws InterruptedException {
    final CountdownLatch latch = new CountdownLatch(1);
    ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
    clusterService.submitStateUpdateTask("delete licensing metadata", new ClusterStateUpdateTask() {
        @Override
        public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
            latch.countDown();
        }
    });

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metadata());
        mdBuilder.removeCustom(LicensesMetadata.TYPE);
        return ClusterState.builder(currentState).metadata(mdBuilder).build();
    }

    @Override
    public void onFailure(String source, @Nullable Exception e) {
        logger.error("error on metaData cleanup after test", e);
    }
});
latch.await();
}

```



```

protected void assertLicenseActive(boolean active) throws InterruptedException {
    boolean success = awaitBusy() -> {
        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.isActive() == active) {
                return true;
            }
        }
        return false;
    });
    assertTrue(success);
}

}

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 */

package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.junit.After;
import org.junit.Before;
import org.mockito.ArgumentCaptor;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseClusterChangeTests extends AbstractLicenseServiceTestCase {

    private TestUtils.AssertingLicenseState licenseState;

    @Before
    public void setup() {

```

```

        licenseState = new TestUtils.AssertingLicenseState();
        setInitialState(null, licenseState, Settings.EMPTY);
        licenseService.start();
    }

    @After
    public void teardown() {
        licenseService.stop();
    }

    public void testNotificationOnNewLicense() throws Exception {
        ClusterState oldState = ClusterState.builder(new ClusterName("a")).build();
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(1));
        assertTrue(licenseState.activeUpdates.get(0));
    }

    public void testNoNotificationOnExistingLicense() throws Exception {
        final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
        Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
        ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
        ClusterState oldState = ClusterState.builder(newState).build();
        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        assertThat(licenseState.activeUpdates.size(), equalTo(0));
    }

    public void testSelfGeneratedLicenseGeneration() throws Exception {
        DiscoveryNode master = new DiscoveryNode("b", buildNewFakeTransportAddress(), emptyMap(), emptySet(),
Version.CURRENT);
        ClusterState oldState = ClusterState.builder(new ClusterName("a"))
            .nodes(DiscoveryNodes.builder().masterNodeId(master.getId()).add(master)).build();
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        ClusterState newState = ClusterState.builder(oldState).nodes(discoveryNodes).build();

        licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(newState);
        LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
    }

```

```

    assertEquals(licenseType, licenseMetaData.getLicense().type());
    long expiration;
    if (licenseType.equals("basic")) {
        expiration = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        expiration = LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis() +
clock.millis();
    }
    assertEquals(expiration, licenseMetaData.getLicense().expiryDate());
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.test.VersionUtils;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.license.License.OperationMode.BASIC;
import static org.elasticsearch.license.License.OperationMode.GOLD;
import static org.elasticsearch.license.License.OperationMode.MISSING;
import static org.elasticsearch.license.License.OperationMode.PLATINUM;
import static org.elasticsearch.license.License.OperationMode.STANDARD;
import static org.elasticsearch.license.License.OperationMode.TRIAL;
import static org.hamcrest.Matchers.is;

/**
 * Unit tests for the {@link XPackLicenseState}
 */
public class XPackLicenseStateTests extends ESTestCase {

    /** Creates a license state with the given license type and active state, and checks the given method returns
    expected. */
    void assertAllowed(OperationMode mode, boolean active, Predicate<XPackLicenseState> predicate, boolean
    expected) {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);

```

```

        licenseState.update(mode, active, null);
        assertEquals(expected, predicate.test(licenseState));
    }

/**
 * Checks the ack message going from the {@code from} license type to {@code to} license type.
 * TODO: check the actual messages, not just the number of them! This was copied from previous license tests...
 */
void assertAckMessages(String feature, OperationMode from, OperationMode to, int expectedMessages) {
    String[] gotMessages = XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.get(feature).apply(from, to);
    assertEquals(expectedMessages, gotMessages.length);
}

static <T> T randomFrom(T[] values, Predicate<T> filter) {
    return randomFrom(Arrays.stream(values).filter(filter).collect(Collectors.toList()));
}

static OperationMode randomMode() {
    return randomFrom(OperationMode.values());
}

public static OperationMode randomTrialStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomTrialOrPlatinumMode() {
    return randomFrom(TRIAL, PLATINUM);
}

public static OperationMode randomTrialBasicStandardGoldOrPlatinumMode() {
    return randomFrom(TRIAL, BASIC, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomBasicStandardOrGold() {
    return randomFrom(BASIC, STANDARD, GOLD);
}

public void testSecurityDefaults() {
    XPackLicenseState licenseState =
        new XPackLicenseState(Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(),
true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

```

```

licenseState =
    new XPackLicenseState(Settings.builder().put(XPackSettings.TRANSPORT_SSL_ENABLED.getKey(),
true).build());
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, true, null);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(BASIC, false, null);

    assertThat(licenseState.isAuthAllowed(), is(false));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

```

```

}

public void testSecurityStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(STANDARD, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(false));
    assertThat(licenseState.isAuditingAllowed(), is(false));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGold() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(GOLD, false, null);
}

```

```

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, true, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
        Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testNewTrialDefaultsSecurityOff() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, VersionUtils.randomVersionBetween(random(), Version.V_6_3_0,
Version.CURRENT));

    assertThat(licenseState.isSecurityEnabled(), is(false));
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
}

```

```

    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testOldTrialDefaultsSecurityOn() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(TRIAL, true, rarely() ? null : VersionUtils.randomVersionBetween(random(),
Version.V_5_6_0, Version.V_6_2_4));

    assertThat(licenseState.isSecurityEnabled(), is(true));
    assertThat(licenseState.isAuthAllowed(), is(true));
    assertThat(licenseState.isIpFilteringAllowed(), is(true));
    assertThat(licenseState.isAuditingAllowed(), is(true));
    assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
    assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
    assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
    assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityAckBasicToNotGoldOrStandard() {
    OperationMode toMode = randomFrom(OperationMode.values(), mode -> mode != GOLD && mode !=
STANDARD);
    assertAckMessages(XPackField.SECURITY, BASIC, toMode, 0);
}

public void testSecurityAckAnyToTrialOrPlatinum() {
    assertAckMessages(XPackField.SECURITY, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSecurityAckTrialStandardGoldOrPlatinumToBasic() {
    assertAckMessages(XPackField.SECURITY, randomTrialStandardGoldOrPlatinumMode(), BASIC, 3);
}

public void testSecurityAckAnyToStandard() {
    OperationMode from = randomFrom(BASIC, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.SECURITY, from, STANDARD, 4);
}

public void testSecurityAckBasicStandardTrialOrPlatinumToGold() {
    OperationMode from = randomFrom(BASIC, PLATINUM, TRIAL, STANDARD);
    assertAckMessages(XPackField.SECURITY, from, GOLD, 2);
}

public void testMonitoringAckBasicToAny() {
    assertAckMessages(XPackField.MONITORING, BASIC, randomMode(), 0);
}

```



```

public void testMonitoringAckAnyToTrialGoldOrPlatinum() {
    assertAckMessages(XPackField.MONITORING, randomMode(),
randomTrialStandardGoldOrPlatinumMode(), 0);
}

public void testMonitoringAckNotBasicToBasic() {
    OperationMode from = randomFrom(STANDARD, GOLD, PLATINUM, TRIAL);
    assertAckMessages(XPackField.MONITORING, from, BASIC, 2);
}

public void testMonitoringAllowed() {
    assertAllowed(randomMode(), true, XPackLicenseState::isMonitoringAllowed, true);
    assertAllowed(randomMode(), false, XPackLicenseState::isMonitoringAllowed, false);
}

public void testMonitoringUpdateRetention() {
    assertAllowed(STANDARD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(TRIAL, true, XPackLicenseState::isUpdateRetentionAllowed, true);
    assertAllowed(BASIC, true, XPackLicenseState::isUpdateRetentionAllowed, false);
    assertAllowed(MISSING, false, XPackLicenseState::isUpdateRetentionAllowed, false);
}

public void testWatcherPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isWatcherAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isWatcherAllowed, true);
}

public void testWatcherBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testWatcherInactivePlatinumGoldTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isWatcherAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isWatcherAllowed, false);
}

public void testGraphPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isGraphAllowed, true);
}

```

```

    assertAllowed(PLATINUM, true, XPackLicenseState::isGraphAllowed, true);
}

public void testGraphBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningPlatinumTrial() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isMachineLearningAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isMachineLearningAllowed, true);
}

public void testMachineLearningBasic() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningStandard() throws Exception {
    assertAllowed(STANDARD, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactiveBasic() {
    assertAllowed(BASIC, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactivePlatinumTrial() throws Exception {
    assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testLogstashPlatinumGoldTrialStandard() throws Exception {
    assertAllowed(TRIAL, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(GOLD, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(PLATINUM, true, XPackLicenseState::isLogstashAllowed, true);
    assertAllowed(STANDARD, true, XPackLicenseState::isLogstashAllowed, true);
}

```

```

public void testLogstashBasicLicense() throws Exception {
    assertAllowed(BASIC, true, XPackLicenseState::isLogstashAllowed, false);
}

public void testLogstashInactive() {
    assertAllowed(BASIC, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(TRIAL, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(GOLD, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(PLATINUM, false, XPackLicenseState::isLogstashAllowed, false);
    assertAllowed(STANDARD, false, XPackLicenseState::isLogstashAllowed, false);
}

public void testSqlDefaults() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlBasic() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlBasicExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(BASIC, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandard() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandardExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(STANDARD, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
}

```

```

    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGold() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGoldExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(GOLD, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlPlatinum() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, true, null);

    assertThat(licenseState.isSqlAllowed(), is(true));
    assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlPlatinumExpired() {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    licenseState.update(PLATINUM, false, null);

    assertThat(licenseState.isSqlAllowed(), is(false));
    assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlAckAnyToTrialOrPlatinum() {
    assertThatAckMessages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
    assertThatAckMessages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
}

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.

```

```

*/
package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartTrialLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
            .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartTrial() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
        ensureStartingWithBasic();
    }

```

```

RestClient restClient = getRestClient();
Response response = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":true}", body);

// Test that starting will fail without acknowledgement
Response response2 = restClient.performRequest("POST", "/_xpack/license/start_trial");
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"trial_was_started\":false"));
assertTrue(body2.contains("\"error_message\":\"Operation failed: Needs acknowledgement.\""));
assertTrue(body2.contains("\"acknowledged\":false"));

assertBusy(() -> {
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals("basic", getLicenseResponse.license().type());
});

String type = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Response response3 = restClient.performRequest("POST",
"/_xpack/license/start_trial?acknowledge=true&type=" + type);
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertTrue(body3.contains("\"trial_was_started\":true"));
assertTrue(body3.contains("\"type\":\"" + type + "\""));
assertTrue(body3.contains("\"acknowledged\":true"));

assertBusy(() -> {
    GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
    assertEquals(type, postTrialLicenseResponse.license().type());
});

Response response4 = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response4.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":false}", body4);

String secondAttemptType = randomFrom(LicenseService.VALID_TRIAL_TYPES);

ResponseException ex = expectThrows(ResponseException.class,
() -> restClient.performRequest("POST", "/_xpack/license/start_trial?acknowledge=true&type=" +
secondAttemptType));

```

```

    Response response5 = ex.getResponse();
    String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(403, response5.getStatusLine().getStatusCode());
    assertTrue(body5.contains("\"trial_was_started\":false"));
    assertTrue(body5.contains("\"error_message\":\"Operation failed: Trial was already activated.\""));
}

public void testInvalidType() throws Exception {
    ensureStartingWithBasic();

    ResponseException ex = expectThrows(ResponseException.class, () ->
        getClient().performRequest("POST", "/_xpack/license/start_trial?type=basic"));
    Response response = ex.getResponse();
    String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(400, response.getStatusLine().getStatusCode());
    assertTrue(body.contains("\"type\":\"illegal_argument_exception\""));
    assertTrue(body.contains("\"reason\":\"Cannot start trial of type [basic]. Valid trial types are [\"]"));
}

private void ensureStartingWithBasic() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();

    if ("basic".equals(getLicenseResponse.license().type()) == false) {
        licensingClient.preparePostStartBasic().setAcknowledge(true).get();
    }

    assertBusy(() -> {
        GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("basic", postTrialLicenseResponse.license().type());
    });
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.env.Environment;
import org.elasticsearch.plugins.Plugin;

```

```

import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.nullValue;

@ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
transportClientRatio = 0)
public class LicenseServiceClusterTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return nodeSettingsBuilder(nodeOrdinal).build();
    }

    private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put("resource.reload.interval.high", "500ms") // for license mode file watcher
            .put(NetworkModule.HTTP_ENABLED.getKey(), true);
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return nodePlugins();
    }

    public void testClusterRestartWithLicense() throws Exception {
        wipeAllLicenses();

        int numNodes = randomIntBetween(1, 5);
        logger.info("--> starting { } node(s)", numNodes);
    }
}

```



```

internalCluster().startNodes(numNodes);
ensureGreen();

logger.info("--> put signed license");
LicensingClient licensingClient = new LicensingClient(client());
License license = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(1));
putLicense(license);
assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
assertOperationMode(license.operationMode());

logger.info("--> restart all nodes");
internalCluster().fullRestart();
ensureYellow();
licensingClient = new LicensingClient(client());
logger.info("--> get and check signed license");
assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
logger.info("--> remove licenses");
licensingClient.prepareDeleteLicense().get();
assertOperationMode(License.OperationMode.MISSING);

logger.info("--> restart all nodes");
internalCluster().fullRestart();
licensingClient = new LicensingClient(client());
ensureYellow();
assertThat(licensingClient.prepareGetLicense().get().license(), nullValue());
assertOperationMode(License.OperationMode.MISSING);

wipeAllLicenses();
}

public void testCloudInternalLicense() throws Exception {
    wipeAllLicenses();

    int numNodes = randomIntBetween(1, 5);
    logger.info("--> starting { } node(s)", numNodes);
    internalCluster().startNodes(numNodes);
    ensureGreen();

    logger.info("--> put signed license");
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("cloud_internal", License.VERSION_CURRENT,
System.currentTimeMillis(),
        TimeValue.timeValueMinutes(1));
    putLicense(license);
    assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
    assertOperationMode(License.OperationMode.PLATINUM);
    writeCloudInternalMode("gold");
}

```

```

    assertOperationMode(License.OperationMode.GOLD);
    writeCloudInternalMode("basic");
    assertOperationMode(License.OperationMode.BASIC);
}

public void testClusterRestartWhileEnabled() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for enabled");
    assertLicenseActive(true);
}

public void testClusterRestartWhileGrace() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    assertLicenseActive(true);
    putLicense(TestUtils.generateSignedLicense(TimeValue.timeValueMillis(0)));
    ensureGreen();
    assertLicenseActive(true);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for grace_period");
    assertLicenseActive(true);
}

public void testClusterRestartWhileExpired() throws Exception {
    wipeAllLicenses();
    internalCluster().startNode();
    ensureGreen();
    assertLicenseActive(true);
    putLicense(TestUtils.generateExpiredNonBasicLicense(System.currentTimeMillis() -
LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    assertLicenseActive(false);
    logger.info("--> restart node");
    internalCluster().fullRestart();
    ensureYellow();
    logger.info("--> await node for disabled");
    assertLicenseActive(false);
}

private void assertOperationMode(License.OperationMode operationMode) throws InterruptedException {
    boolean success = awaitBusy() -> {

```

```

        for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
            if (licenseState.getOperationMode() == operationMode) {
                return true;
            }
        }
        return false;
    });
    assertTrue(success);
}

private void writeCloudInternalMode(String mode) throws Exception {
    for (Environment environment : internalCluster().getDataOrMasterNodeInstances(Environment.class)) {
        Path licenseModePath = XPackPlugin.resolveConfigFile(environment, "license_mode");
        Files.createDirectories(licenseModePath.getParent());
        Files.write(licenseModePath, mode.getBytes(StandardCharsets.UTF_8));
    }
}

}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.test.ESTestCase;

import java.util.Arrays;

import static org.hamcrest.Matchers.contains;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.hasSize;

public class LicenseUtilsTests extends ESTestCase {

    public void testNewExpirationException() {
        for (String feature : Arrays.asList("feature", randomAlphaOfLength(5), null, "")) {
            ElasticsearchSecurityException exception = LicenseUtils.newComplianceException(feature);
            assertNotNull(exception);
            assertThat(exception.getMetadataKeys(), contains(LicenseUtils.EXPIRED_FEATURE_METADATA));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasSize(1));
            assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA).iterator().next(),
                equalTo(feature));
        }
    }
}

```

```

public void testIsLicenseExpiredException() {
    ElasticsearchSecurityException exception = LicenseUtils.newComplianceException("feature");
    assertTrue(LicenseUtils.isLicenseExpiredException(exception));

    exception = new ElasticsearchSecurityException("msg");
    assertFalse(LicenseUtils.isLicenseExpiredException(exception));
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.Before;

import java.nio.file.Path;

import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Matchers.eq;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.verifyZeroInteractions;

public class LicenseOperationModeUpdateTests extends ESTestCase {

    private OperationModeFileWatcher operationModeFileWatcher;
    private Path licenseModeFile;
    private ResourceWatcherService resourceWatcherService;

    @Before
    public void init() throws Exception {
        licenseModeFile = createTempFile();
        resourceWatcherService = mock(ResourceWatcherService.class);
        operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService, licenseModeFile,
logger, () -> {});
    }

    public void testLicenseOperationModeUpdate() throws Exception {
        String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
        License license = License.builder()
            .uid("id")

```

```

        .expiryDate(0)
        .issueDate(0)
        .issuedTo("elasticsearch")
        .issuer("issuer")
        .type(type)
        .maxNodes(1)
        .build();

    assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
    OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
    license.setOperationModeFileWatcher(operationModeFileWatcher);
    verifyZeroInteractions(resourceWatcherService);
    assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
}

public void testCloudInternalLicenseOperationModeUpdate() throws Exception {
    License license = License.builder()
        .uid("id")
        .expiryDate(0)
        .issueDate(0)
        .issuedTo("elasticsearch")
        .issuer("issuer")
        .type("cloud_internal")
        .maxNodes(1)
        .build();

    assertThat(license.operationMode(), equalTo(License.OperationMode.PLATINUM));
    OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
    license.setOperationModeFileWatcher(operationModeFileWatcher);
    verify(resourceWatcherService, times(1)).add(any(FileWatcher.class),
    eq(ResourceWatcherService.Frequency.HIGH));
    assertThat(license.operationMode(), equalTo(License.OperationMode.GOLD));
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import org.junit.Before;

import static org.hamcrest.Matchers.equalTo;

```

```

public class LicenseScheduleTests extends ESTestCase {

    private License license;
    private SchedulerEngine.Schedule schedule;

    @Before
    public void setuo() throws Exception {
        license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
        schedule = LicenseService.nextLicenseCheck(license);
    }

    public void testEnabledLicenseSchedule() throws Exception {
        int expiryDuration = (int) (license.expiryDate() - license.issueDate());
        long triggeredTime = license.issueDate() + between(0, expiryDuration);
        assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
            equalTo(license.expiryDate()));
    }

    public void testGraceLicenseSchedule() throws Exception {
        long triggeredTime = license.expiryDate() + between(1,
            ((int) LicenseService.GRACE_PERIOD_DURATION.getMillis()));
        assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
            equalTo(license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis()));
    }

    public void testExpiredLicenseSchedule() throws Exception {
        long triggeredTime = license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis() +
            randomIntBetween(1, 1000);
        assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
            equalTo(-1L));
    }

    public void testInvalidLicenseSchedule() throws Exception {
        long triggeredTime = license.issueDate() - randomIntBetween(1, 1000);
        assertThat(schedule.nextScheduledTimeAfter(triggeredTime, triggeredTime),
            equalTo(license.issueDate()));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;

```

```

import static org.elasticsearch.common.unit.TimeValue.timeValueMillis;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.nullValue;

public class ExpirationCallbackTests extends ESTestCase {

    public void testPostExpirationDelay() throws Exception {
        TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
        TimeValue min = TimeValue.timeValueSeconds(1);
        TimeValue max = TimeValue.timeValueSeconds(4);
        TimeValue frequency = TimeValue.timeValueSeconds(1);
        NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, max, frequency);
        long now = System.currentTimeMillis();
        long expiryDate = now + expiryDuration.getMillis();
        assertThat(post.delay(expiryDate, now),
            equalTo(TimeValue.timeValueMillis(expiryDuration.getMillis() + min.getMillis()))); // before license
        expiry
        assertThat(post.delay(expiryDate, expiryDate), equalTo(min)); // on license expiry
        int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
        int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
        assertExpirationCallbackDelay(post, expiryDuration.millis(), latestValidTriggerDelay,
            earliestValidTriggerDelay);
    }

    public void testPreExpirationDelay() throws Exception {
        TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
        TimeValue min = TimeValue.timeValueSeconds(1);
        TimeValue max = TimeValue.timeValueSeconds(4);
        TimeValue frequency = TimeValue.timeValueSeconds(1);
        NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
        long now = System.currentTimeMillis();
        long expiryDate = now + expiryDuration.getMillis();
        assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
        int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
        int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
        assertExpirationCallbackDelay(pre, expiryDuration.millis(), latestValidTriggerDelay,
            earliestValidTriggerDelay);
    }

    public void testPostExpirationWithNullMax() throws Exception {
        int postExpirySeconds = randomIntBetween(5, 10);
        TimeValue postExpiryDuration = TimeValue.timeValueSeconds(postExpirySeconds);
        TimeValue min = TimeValue.timeValueSeconds(postExpirySeconds - randomIntBetween(1, 3));

        final ExpirationCallback.Post post = new NoopPostExpirationCallback(min, null, timeValueMillis(10));
        long now = System.currentTimeMillis();
        assertThat(post.delay(now - postExpiryDuration.millis(), now), equalTo(TimeValue.timeValueMillis(0)));
    }
}

```

```

public void testPreExpirationWithNullMin() throws Exception {
    int expirySeconds = randomIntBetween(5, 10);
    TimeValue expiryDuration = TimeValue.timeValueSeconds(expirySeconds);
    TimeValue max = TimeValue.timeValueSeconds(expirySeconds + randomIntBetween(1, 10));

    final ExpirationCallback.Pre pre = new NoopPreExpirationCallback(null, max, timeValueMillis(10));
    long now = System.currentTimeMillis();
    assertThat(pre.delay(expiryDuration.millis() + now, now), equalTo(TimeValue.timeValueMillis(0)));
}

public void testPreExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
    earliestValidTriggerDelay);
}

public void testPostExpirationScheduleTime() throws Exception {
    TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
    TimeValue min = TimeValue.timeValueSeconds(1);
    TimeValue max = TimeValue.timeValueSeconds(4);
    TimeValue frequency = TimeValue.timeValueSeconds(1);
    NoopPostExpirationCallback pre = new NoopPostExpirationCallback(min, max, frequency);
    int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
    int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
    assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
    earliestValidTriggerDelay);
}

private void assertExpirationCallbackDelay(ExpirationCallback expirationCallback, long expiryDuration,
    int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    // bounds
    assertThat(expirationCallback.delay(expiryDate, now + earliestValidTriggerDelay),
    equalTo(TimeValue.timeValueMillis(0)));
    assertThat(expirationCallback.delay(expiryDate, now + latestValidTriggerDelay),
    equalTo(TimeValue.timeValueMillis(0)));
    // in match
    assertThat(expirationCallback.delay(expiryDate,
    now + randomIntBetween(earliestValidTriggerDelay, latestValidTriggerDelay)),
    equalTo(TimeValue.timeValueMillis(0)));
}

```



```

// out of bounds
int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay);
assertThat(expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch),
    equalTo(TimeValue.timeValueMillis(earliestValidTriggerDelay - deltaBeforeEarliestMatch)));
int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
assertThat(expirationCallback.delay(expiryDate, expiryDate + deltaAfterLatestMatch), nullValue());
}

public void assertExpirationCallbackScheduleTime(ExpirationCallback expirationCallback, long expiryDuration,
    int latestValidTriggerDelay, int earliestValidTriggerDelay) {
    long now = System.currentTimeMillis();
    long expiryDate = now + expiryDuration;
    int validTriggerInterval = between(earliestValidTriggerDelay, latestValidTriggerDelay);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + validTriggerInterval, now + validTriggerInterval),
        equalTo(now + validTriggerInterval));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + validTriggerInterval),
        equalTo(now + validTriggerInterval + expirationCallback.getFrequency()));

    int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay - 1);
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now +
deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaBeforeEarliestMatch, now + deltaBeforeEarliestMatch),
        equalTo(now + deltaBeforeEarliestMatch +
            expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));

    int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + deltaAfterLatestMatch),
equalTo(-1L));
    assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
        now + deltaAfterLatestMatch, now + deltaAfterLatestMatch),
        equalTo(-1L));
}

private static class NoopPostExpirationCallback extends ExpirationCallback.Post {

    NoopPostExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}

```

```

private static class NoopPreExpirationCallback extends ExpirationCallback.Pre {

    NoopPreExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
        super(min, max, frequency);
    }

    @Override
    public void on(License license) {}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import com.carrotsearch.randomizedtesting.RandomizedTest;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.licensor.LicenseSigner;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;
import org.junit.Assert;

import java.io.IOException;
import java.io.InputStream;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardCopyOption;
import java.util.ArrayList;
import java.util.List;
import java.util.UUID;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReference;

```

```

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static org.apache.lucene.util.LuceneTestCase.createTempFile;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomAlphaOfLength;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.elasticsearch.test.ESTestCase.randomIntBetween;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.junit.Assert.assertThat;

public class TestUtils {

    private static final FormatDateTimeFormatter formatDateTimeFormatter = Joda.forPattern("yyyy-MM-dd");
    private static final DateMathParser dateMathParser = new DateMathParser(formatDateTimeFormatter);
    private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

    public static String dateMathString(String time, final long now) {
        return dateTimeFormatter.print(dateTimeFormatter.parse(time, () -> now));
    }

    public static long dateMath(String time, final long now) {
        return dateMathParser.parse(time, () -> now);
    }

    public static LicenseSpec generateRandomLicenseSpec(int version) {
        boolean datesInMillis = randomBoolean();
        long now = System.currentTimeMillis();
        String uid = UUID.randomUUID().toString();
        String feature = "feature__" + randomInt();
        String issuer = "issuer__" + randomInt();
        String issuedTo = "issuedTo__" + randomInt();
        final String type;
        final String subscriptionType;
        if (version < License.VERSION_NO_FEATURE_TYPE) {
            subscriptionType = randomFrom("gold", "silver", "platinum");
            type = "subscription";//randomFrom("subscription", "internal", "development");
        } else {
            subscriptionType = null;
            type = randomFrom("basic", "dev", "gold", "silver", "platinum");
        }
        int maxNodes = RandomizedTest.randomIntBetween(5, 100);
        if (datesInMillis) {
            long issueDateInMillis = dateMath("now", now);
            long expiryDateInMillis = dateMath("now+10d/d", now);
            return new LicenseSpec(version, uid, feature, issueDateInMillis, expiryDateInMillis, type, subscriptionType,
issuedTo, issuer,
                maxNodes);
        } else {

```

```

        String issueDate = dateMathString("now", now);
        String expiryDate = dateMathString("now+10d/d", now);
        return new LicenseSpec(version, uid, feature, issueDate, expiryDate, type, subscriptionType, issuedTo,
issuer, maxNodes);
    }
}

```

```

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
    XContentBuilder licenses = jsonBuilder();
    licenses.startObject();
    licenses.startArray("licenses");
    licenses.startObject()
        .field("uid", licenseSpec.uid)
        .field("type", licenseSpec.type)
        .field("subscription_type", licenseSpec.subscriptionType)
        .field("issued_to", licenseSpec.issuedTo)
        .field("issuer", licenseSpec.issuer)
        .field("feature", licenseSpec.feature)
        .field("max_nodes", licenseSpec.maxNodes);

    if (licenseSpec.issueDate != null) {
        licenses.field("issue_date", licenseSpec.issueDate);
    } else {
        licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
    }

    if (licenseSpec.expiryDate != null) {
        licenses.field("expiry_date", licenseSpec.expiryDate);
    } else {
        licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
    }

    licenses.field("version", licenseSpec.version);
    licenses.endObject();
    licenses.endArray();
    licenses.endObject();
    return Strings.toString(licenses);
}

```

```

public static License generateLicenses(LicenseSpec spec) {
    License.Builder builder = License.builder()
        .uid(spec.uid)
        .feature(spec.feature)
        .type(spec.type)
        .subscriptionType(spec.subscriptionType)
        .issuedTo(spec.issuedTo)
        .issuer(spec.issuer)
        .maxNodes(spec.maxNodes);

    if (spec.expiryDate != null) {

```

```

        builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
    } else {
        builder.expiryDate(spec.expiryDateInMillis);
    }
    if (spec.issueDate != null) {
        builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
    } else {
        builder.issueDate(spec.issueDateInMillis);
    }
    return builder.build();
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
    MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
    MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
    MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
    MatcherAssert.assertThat(license.type(), equalTo(spec.type));
    MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
    if (spec.issueDate != null) {
        MatcherAssert.assertThat(license.issueDate(), equalTo(DateUtils.beginningOfDay(spec.issueDate)));
    } else {
        MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
    }
    if (spec.expiryDate != null) {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(DateUtils.endOfDay(spec.expiryDate)));
    } else {
        MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
    }
}

public static class LicenseSpec {
    public final int version;
    public final String feature;
    public final String issueDate;
    public final long issueDateInMillis;
    public final String expiryDate;
    public final long expiryDateInMillis;
    public final String uid;
    public final String type;
    public final String subscriptionType;
    public final String issuedTo;
    public final String issuer;
    public final int maxNodes;

    public LicenseSpec(String issueDate, String expiryDate) {
        this(License.VERSION_CURRENT, UUID.randomUUID().toString(), "feature", issueDate, expiryDate,
            "trial", "none", "customer",
            "elasticsearch", 5);
    }
}

```

```

    }

    public LicenseSpec(int version, String uid, String feature, long issueDateInMillis, long expiryDateInMillis,
String type,
        String subscriptionType, String issuedTo, String issuer, int maxNodes) {
        this.version = version;
        this.feature = feature;
        this.issueDateInMillis = issueDateInMillis;
        this.issueDate = null;
        this.expiryDateInMillis = expiryDateInMillis;
        this.expiryDate = null;
        this.uid = uid;
        this.type = type;
        this.subscriptionType = subscriptionType;
        this.issuedTo = issuedTo;
        this.issuer = issuer;
        this.maxNodes = maxNodes;
    }

```

```

public LicenseSpec(int version, String uid, String feature, String issueDate, String expiryDate, String type,
        String subscriptionType, String issuedTo, String issuer, int maxNodes) {
    this.version = version;
    this.feature = feature;
    this.issueDate = issueDate;
    this.issueDateInMillis = -1;
    this.expiryDate = expiryDate;
    this.expiryDateInMillis = -1;
    this.uid = uid;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.issuedTo = issuedTo;
    this.issuer = issuer;
    this.maxNodes = maxNodes;
}
}

```

```

public static Path getTestPriKeyPath() throws Exception {
    return getResourcePath("/private.key");
}

```

```

public static Path getTestPubKeyPath() throws Exception {
    return getResourcePath("/public.key");
}

```

```

public static String dumpLicense(License license) throws Exception {
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    builder.startObject();
    builder.startObject("license");
}

```

```

        license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        return Strings.toString(builder);
    }

    public static License generateSignedLicense(TimeValue expiryDuration) throws Exception {
        return generateSignedLicense(null, -1, expiryDuration);
    }

    public static License generateSignedLicense(String type, TimeValue expiryDuration) throws Exception {
        return generateSignedLicense(type, -1, expiryDuration);
    }

    public static License generateSignedLicense(long issueDate, TimeValue expiryDuration) throws Exception {
        return generateSignedLicense(null, issueDate, expiryDuration);
    }

    public static License generateSignedLicense(String type, long issueDate, TimeValue expiryDuration) throws
Exception {
        return generateSignedLicense(type, randomIntBetween(License.VERSION_START,
License.VERSION_CURRENT), issueDate, expiryDuration);
    }

    /**
     * This method which chooses the license type randomly if the type is null. However, it will not randomly
     * choose trial or basic types as those types can only be self-generated.
     */
    public static License generateSignedLicense(String type, int version, long issueDate, TimeValue expiryDuration)
throws Exception {
        long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() -
TimeValue.timeValueHours(2).getMillis();
        final String licenseType;
        if (version < License.VERSION_NO_FEATURE_TYPE) {
            licenseType = randomFrom("subscription", "internal", "development");
        } else {
            licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
        }
        final License.Builder builder = License.builder()
            .uid(UUID.randomUUID().toString())
            .version(version)
            .expiryDate(System.currentTimeMillis() + expiryDuration.getMillis())
            .issueDate(issue)
            .type(licenseType)
            .issuedTo("customer")
            .issuer("elasticsearch")
            .maxNodes(5);
        if (version == License.VERSION_START) {

```

```

        builder.subscriptionType((type != null) ? type : randomFrom("dev", "gold", "platinum", "silver"));
        builder.feature(randomAlphaOfLength(10));
    }
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateSignedLicense(License.Builder builder) throws Exception {
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

public static License generateExpiredNonBasicLicense(long expiryDate) throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"), expiryDate);
}

public static License generateExpiredNonBasicLicense() throws Exception {
    return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

public static License generateExpiredNonBasicLicense(String type) throws Exception {
    return generateExpiredNonBasicLicense(type,
        System.currentTimeMillis() - TimeValue.timeValueHours(randomIntBetween(1, 10)).getMillis());
}

public static License generateExpiredNonBasicLicense(String type, long expiryDate) throws Exception {
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(expiryDate)
        .issueDate(expiryDate - TimeValue.timeValueMinutes(10).getMillis())
        .type(type)
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
    return signer.sign(builder.build());
}

private static Path getResourcePath(String resource) throws Exception {
    Path resourceFile = createTempFile();
    try (InputStream resourceInput = TestUtils.class.getResourceAsStream(resource)) {
        Files.copy(resourceInput, resourceFile, StandardCopyOption.REPLACE_EXISTING);
    }
    return resourceFile;
}

public static void registerAndAckSignedLicenses(final LicenseService licenseService, License license,

```



```

        final LicensesStatus expectedStatus) {
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(license).acknowledge(true);
    final CountDownLatch latch = new CountDownLatch(1);
    final AtomicReference<LicensesStatus> status = new AtomicReference<>();
    licenseService.registerLicense(putLicenseRequest, new ActionListener<PutLicenseResponse>() {
        @Override
        public void onResponse(PutLicenseResponse licensesUpdateResponse) {
            status.set(licensesUpdateResponse.status());
            latch.countDown();
        }

        @Override
        public void onFailure(Exception e) {
            latch.countDown();
        }
    });
    try {
        latch.await();
    } catch (InterruptedException e) {
        Assert.fail(e.getMessage());
    }
    assertThat(status.get(), equalTo(expectedStatus));
}

```

```

public static class AssertingLicenseState extends XPackLicenseState {
    public final List<License.OperationMode> modeUpdates = new ArrayList<>();
    public final List<Boolean> activeUpdates = new ArrayList<>();
    public final List<Version> trialVersionUpdates = new ArrayList<>();

```

```

    public AssertingLicenseState() {
        super(Settings.EMPTY);
    }

```

```

    @Override
    void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
        modeUpdates.add(mode);
        activeUpdates.add(active);
        trialVersionUpdates.add(mostRecentTrialVersion);
    }
}

```

```

/**

```

```

 * A license state that makes the { @link #update(License.OperationMode, boolean, Version)}

```

```

 * method public for use in tests.

```

```

 */

```

```

public static class UpdatableLicenseState extends XPackLicenseState {

```

```

    public UpdatableLicenseState() {
        this(Settings.EMPTY);
    }

```

```

    }

    public UpdatableLicenseState(Settings settings) {
        super(settings);
    }

    @Override
    public void update(License.OperationMode mode, boolean active, Version mostRecentTrialVersion) {
        super.update(mode, active, mostRecentTrialVersion);
    }
}

public static void putLicense(MetaData.Builder builder, License license) {
    builder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.common.unit.TimeValue.timeValueHours;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicensesAcknowledgementTests extends AbstractLicenseServiceTestCase {

    public void testAcknowledgment() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(TestUtils.generateSignedLicense("gold", timeValueHours(2)), licenseState, Settings.EMPTY);
        licenseService.start();
        // try installing a signed license
        long issueDate = System.currentTimeMillis() - TimeValue.timeValueHours(24 * 2).getMillis();
        License signedLicense = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, issueDate,
            timeValueHours(10));
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
        // ensure acknowledgement message was part of the response
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,

```

```

LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(0)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testRejectUpgradeToProductionWithoutTLS() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.EMPTY);
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    // ensure acknowledgement message was part of the response
    IllegalStateException ise = expectThrows(IllegalStateException.class, () ->
        licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true)));
    assertEquals("Cannot install a [PLATINUM] license unless TLS is configured or security is disabled",
ise.getMessage());
}

public void testUpgradeToProductionWithoutTLSAndSecurityDisabled() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", false).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

```

```

public void testUpgradeToProductionWithTLSAndSecurity() throws Exception {
    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
        .put("xpack.security.enabled", true)
        .put("xpack.security.transport.ssl.enabled", true).build());
    licenseService.start();
    // try installing a signed license
    License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
    PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
    assertThat(licenseService.getLicense(), not(signedLicense));
    verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

    // try installing a signed license with acknowledgement
    putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
    // ensure license was installed and no acknowledgment message was returned
    licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
    verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
    private final boolean expectedAcknowledgement;
    private final LicensesStatus expectedStatus;
    private final boolean expectAckMessages;

    AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
        boolean expectAckMessages) {
        this.expectedAcknowledgement = expectedAcknowledgement;
        this.expectedStatus = expectedStatus;
        this.expectAckMessages = expectAckMessages;
    }

    @Override
    public void onResponse(PutLicenseResponse licensesUpdateResponse) {
        assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
        assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
        assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
    }

    @Override
    public void onFailure(Exception throwable) {
        throw new RuntimeException(throwable);
    }
}
}

```

```

/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.Before;

import java.util.Collection;
import java.util.Collections;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicBoolean;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;

public class LicensesManagerServiceTests extends ESSingleNodeTestCase {

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        return Settings.builder()
            .put(super.nodeSettings())
            .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
            .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
            .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
            .put(XPackSettings.GRAPH_ENABLED.getKey(), false)
            .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
            .build();
    }

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

```

```

}

@Before
public void waitForTrialLicenseToBeGenerated() throws Exception {
    assertBusy(() ->
assertNotNull(getInstanceFromNode(ClusterService.class).state().metaData().custom(LicensesMetaData.TYPE)));
}

public void testStoreAndGetLicenses() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueHours(1));
    TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
    License silverLicense = TestUtils.generateSignedLicense("silver", TimeValue.timeValueHours(2));
    TestUtils.registerAndAckSignedLicenses(licenseService, silverLicense, LicensesStatus.VALID);
    License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueHours(1));
    TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), equalTo(platinumLicense));
    final License getLicenses = licenseService.getLicense();
    assertThat(getLicenses, equalTo(platinumLicense));
}

// TODO: Add test/feature blocking the registration of basic license

public void testEffectiveLicenses() throws Exception {
    final LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    final ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueSeconds(5));
    // put gold license
    TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(goldLicense));

    License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueSeconds(3));
    // put platinum license
    TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(LicenseService.getLicense(licensesMetaData), equalTo(platinumLicense));
}

public void testInvalidLicenseStorage() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);
    License signedLicense = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()

```

```

        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

TestUtils.registerAndAckSignedLicenses(licenseService, tamperedLicense, LicensesStatus.INVALID);

// ensure that the invalid license never made it to cluster state
LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), not(equalTo(tamperedLicense)));
}

public void testRemoveLicenses() throws Exception {
    LicenseService licenseService = getInstanceFromNode(LicenseService.class);
    ClusterService clusterService = getInstanceFromNode(ClusterService.class);

    // generate signed licenses
    License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(1));
    TestUtils.registerAndAckSignedLicenses(licenseService, license, LicensesStatus.VALID);
    LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), not(LicensesMetaData.LICENSE_TOMBSTONE));

    // remove signed licenses
    removeAndAckSignedLicenses(licenseService);
    licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
    assertThat(licensesMetaData.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

private void removeAndAckSignedLicenses(final LicenseService licenseService) {
    final CountdownLatch latch = new CountdownLatch(1);
    final AtomicBoolean success = new AtomicBoolean(false);
    licenseService.removeLicense(new DeleteLicenseRequest(), new
ActionListener<ClusterStateUpdateResponse>() {
        @Override
        public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
            if (clusterStateUpdateResponse.isAcknowledged()) {
                success.set(true);
            }
            latch.countDown();
        }
    });

    @Override
    public void onFailure(Exception throwable) {
        latch.countDown();
    }
});
try {
    latch.await();
}

```

```

    } catch (InterruptedException e) {
        fail(e.getMessage());
    }
    assertThat("remove license(s) failed", success.get(), equalTo(true));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.threadpool.TestThreadPool;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.After;
import org.junit.Before;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;

import static org.hamcrest.Matchers.equalTo;

public class OperationModeFileWatcherTests extends ESTestCase {
    private ResourceWatcherService watcherService;
    private TestThreadPool threadPool;
    private Path licenseModePath;
    private OperationModeFileWatcher operationModeFileWatcher;
    private AtomicReference<CountDownLatch> onChangeCounter;

    @Before
    public void setup() throws Exception {
        threadPool = new TestThreadPool("license mode file watcher tests");
        Settings settings = Settings.builder()
            .put("resource.reload.interval.high", "10ms")
            .build();
        watcherService = new ResourceWatcherService(settings,
            threadPool);
        watcherService.start();
        licenseModePath = createTempFile();

```



```

onChangeCounter = new AtomicReference<>(new CountdownLatch(1));
operationModeFileWatcher = new OperationModeFileWatcher(watcherService, licenseModePath, logger,
    () -> onChangeCounter.get().countDown());
}

@After
public void shutdown() throws InterruptedException {
    terminate(threadPool);
    watcherService.stop();
}

public void testInit() throws Exception {
    onChangeCounter.set(new CountdownLatch(2));
    writeMode("gold");
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
        License.OperationMode.PLATINUM);
    operationModeFileWatcher.init();
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

public void testUpdateModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
        License.OperationMode.PLATINUM);
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));
    writeMode("basic");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.BASIC));
}

public void testDeleteModeFromFile() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    writeMode("gold");
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
    onChangeCounter.set(new CountdownLatch(1));

    Files.delete(licenseModePath);
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
        equalTo(License.OperationMode.PLATINUM));
}

```

```

public void testInvalidModeFromFile() throws Exception {
    writeMode("invalid");
    operationModeFileWatcher.init();
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
}

public void testLicenseModeFileIsDirectory() throws Exception {
    licenseModePath = createTempDir();
    operationModeFileWatcher.init();
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
    operationModeFileWatcher.onFileChanged(licenseModePath);
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
}

public void testLicenseModeFileCreatedAfterInit() throws Exception {
    Files.delete(licenseModePath);
    operationModeFileWatcher.init();
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(),
    equalTo(License.OperationMode.PLATINUM));
    onChangeCounter.set(new CountdownLatch(1));
    Path tempFile = createTempFile();
    writeMode("gold", tempFile);
    licenseModePath = tempFile;
    assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
    assertEquals(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

private void writeMode(String mode) throws IOException {
    writeMode(mode, licenseModePath);
}

static void writeMode(String mode, Path file) throws IOException {
    Files.write(file, mode.getBytes(StandardCharsets.UTF_8), StandardOpenOption.CREATE);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.test.ESTestCase;

import java.util.Locale;

import static org.elasticsearch.license.License.OperationMode;
import static org.hamcrest.Matchers.equalTo;

/**
 * Tests {@link License.OperationMode} for correctness.
 * <p>
 * If you change the behavior of these tests, then it means that licensing changes across the products!
 */
public class LicenseOperationModeTests extends ESTestCase {
    public void testResolveTrial() {
        // assert 1.x BWC
        assertResolve(OperationMode.TRIAL, "nONE", "DEv", "deveLopment");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.TRIAL, "tRiAl", "trial");
    }

    public void testResolveBasic() {
        // assert expected (2.x+) variant (note: no 1.x variant of BASIC)
        assertResolve(OperationMode.BASIC, "bAsIc", "basic");
    }

    public void testResolveStandard() {
        // assert expected (2.x+) variant (note: no 1.x variant of STANDARD)
        assertResolve(OperationMode.STANDARD, "StAnDARd", "standard");
    }

    public void testResolveGold() {
        // assert expected (2.x+) variant (note: no different 1.x variant of GOLD)
        assertResolve(OperationMode.GOLD, "SiLvEr", "gOId", "silver", "gold");
    }

    public void testResolvePlatinum() {
        // assert 1.x BWC
        assertResolve(OperationMode.PLATINUM, "iNtErNaL");
        // assert expected (2.x+) variant
        assertResolve(OperationMode.PLATINUM, "PlAtINum", "platinum");
    }

    public void testResolveUnknown() {
        // 'enterprise' is a type that exists in cloud but should be rejected under normal operation
        // See https://github.com/elasticsearch/x-plugins/issues/3371
        String[] types = { "unknown", "fake", "enterprise" };
    }
}

```

```

    for (String type : types) {
        try {
            OperationMode.resolve(type);

            fail(String.format(Locale.ROOT, "[%s] should not be recognized as an operation mode", type));
        }
        catch (IllegalArgumentException e) {
            assertThat(e.getMessage(), equalTo("unknown type [" + type + "]"));
        }
    }
}

private static void assertResolve(OperationMode expected, String... types) {
    for (String type : types) {
        assertThat(OperationMode.resolve(type), equalTo(expected));
    }
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;

import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes =
0, transportClientRatio = 0,
    autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return nodeSettingsBuilder(nodeOrdinal).build();
    }
}

```

```

private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
    return Settings.builder()
        .put(super.nodeSettings(nodeOrdinal))
        .put("node.data", true)
        .put("resource.reload.interval.high", "500ms") // for license mode file watcher
        .put(NetworkModule.HTTP_ENABLED.getKey(), true);
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
    return nodePlugins();
}

public void testClusterNotRecovered() throws Exception {
    logger.info("--> start one master out of two [recovery state]");
    internalCluster().startNode(nodeSettingsBuilder(0).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
    logger.info("--> start second master out of two [recovered state]");
    internalCluster().startNode(nodeSettingsBuilder(1).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
    assertLicenseActive(true);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterModule;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.metadata.RepositoriesMetadata;
import org.elasticsearch.cluster.metadata.RepositoryMetadata;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContent.Params;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;

```

```

import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.test.ESTestCase;

import java.util.Collections;
import java.util.UUID;
import java.util.stream.Collectors;
import java.util.stream.Stream;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.notNullValue;
import static org.hamcrest.Matchers.nullValue;

public class LicensesMetaDataSerializationTests extends ESTestCase {

    public void testXContentSerializationOneSignedLicense() throws Exception {
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, null);
        XContentBuilder builder = XContentFactory.jsonBuilder();
        builder.startObject();
        builder.startObject("licenses");
        licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
        assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
        assertNull(licensesMetaDataFromXContent.getMostRecentTrialVersion());
    }

    public void testXContentSerializationOneSignedLicenseWithUsedTrial() throws Exception {
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
        XContentBuilder builder = XContentFactory.jsonBuilder();
        builder.startObject();
        builder.startObject("licenses");
        licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.endObject();
        builder.endObject();
        LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
        assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
        assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
    }

    public void testLicenseMetadataParsingDoesNotSwallowOtherMetadata() throws Exception {
        new Licensing(Settings.EMPTY); // makes sure LicensePlugin is registered in Custom Metadata
        License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
        LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);

```

```

RepositoryMetaData repositoryMetaData = new RepositoryMetaData("repo", "fs", Settings.EMPTY);
RepositoriesMetaData repositoriesMetaData = new RepositoriesMetaData(repositoryMetaData);
final MetaData.Builder metaDataBuilder = MetaData.builder();
if (randomBoolean()) { // random order of insertion
    metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
    metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
} else {
    metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
    metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
}
// serialize metadata
XContentBuilder builder = XContentFactory.jsonBuilder();
Params params = new
ToXContent.MapParams(Collections.singletonMap(MetaData.CONTEXT_MODE_PARAM,
MetaData.CONTEXT_MODE_GATEWAY));
builder.startObject();
builder = metaDataBuilder.build().toXContent(builder, params);
builder.endObject();
// deserialize metadata again
MetaData metaData = MetaData.Builder.fromXContent(createParser(builder));
// check that custom metadata still present
assertThat(metaData.custom(licensesMetaData.getWriteableName()), notNullValue());
assertThat(metaData.custom(repositoriesMetaData.getWriteableName()), notNullValue());
}

public void testXContentSerializationOneTrial() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .uid(UUID.randomUUID().toString())
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .type(randomBoolean() ? "trial" : "basic")
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
    final License trialLicense = SelfGeneratedLicense.create(specBuilder);
    LicensesMetaData licensesMetaData = new LicensesMetaData(trialLicense, Version.CURRENT);
    XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.endObject();
    builder.endObject();
    LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(trialLicense));
    assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

```

```

public void testLicenseTombstoneFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

public void testLicenseTombstoneWithUsedTrialFromXContext() throws Exception {
    final XContentBuilder builder = XContentFactory.jsonBuilder();
    builder.startObject();
    builder.startObject("licenses");
    builder.nullField("license");
    builder.field("trial_license", Version.CURRENT.toString());
    builder.endObject();
    builder.endObject();
    LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
    assertThat(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
    assertEquals(metaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

private static LicensesMetaData getLicensesMetaDataFromXContent(XContentParser parser) throws Exception {
    parser.nextToken(); // consume null
    parser.nextToken(); // consume "licenses"
    LicensesMetaData licensesMetaDataFromXContent = LicensesMetaData.fromXContent(parser);
    parser.nextToken(); // consume endObject
    assertThat(parser.nextToken(), nullValue());
    return licensesMetaDataFromXContent;
}

@Override
protected NamedXContentRegistry xContentRegistry() {
    return new NamedXContentRegistry(Stream.concat(
        new Licensing(Settings.EMPTY).getNamedXContent().stream(),
        ClusterModule.getNamedXWriteables().stream()
    ).collect(Collectors.toList()));
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```



```

import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.settings.Settings;
import org.mockito.ArgumentCaptor;
import org.mockito.Mockito;

import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseRegistrationTests extends AbstractLicenseServiceTestCase {

    public void testSelfGeneratedTrialLicense() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(null, licenseState, Settings.EMPTY, "trial");
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        licenseService.start();

        ClusterState state = ClusterState.builder(new ClusterName("a")).build();
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
        ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
        LicensesMetaData licenseMetaData = stateWithLicense.metadata().custom(LicensesMetaData.TYPE);
        assertNotNull(licenseMetaData);
        assertNotNull(licenseMetaData.getLicense());
        assertFalse(licenseMetaData.isEligibleForTrial());
        assertEquals("trial", licenseMetaData.getLicense().type());
        assertEquals(clock.millis() +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis(),
            licenseMetaData.getLicense().expiryDate());
    }

    public void testSelfGeneratedBasicLicense() throws Exception {
        XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
        setInitialState(null, licenseState, Settings.EMPTY, "basic");
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
        licenseService.start();

        ClusterState state = ClusterState.builder(new ClusterName("a")).build();
        ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
        verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());

```

```

ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
}

```

```

public void testNonSelfGeneratedBasicLicenseIsReplaced() throws Exception {

```

```

    long now = System.currentTimeMillis();
    String uid = UUID.randomUUID().toString();
    final License.Builder builder = License.builder()
        .uid(uid)
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(now)
        .issueDate(now)
        .type("basic")
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);

```

```

    License license = TestUtils.generateSignedLicense(builder);

```

```

    XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
    setInitialState(license, licenseState, Settings.EMPTY);
    when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
    licenseService.start();

```

```

    MetaData.Builder mdBuilder = MetaData.builder();
    mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
    ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
    ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
    verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
    ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
    LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
    assertNotNull(licenseMetaData);
    assertNotNull(licenseMetaData.getLicense());
    assertTrue(licenseMetaData.isEligibleForTrial());
    assertEquals("basic", licenseMetaData.getLicense().type());
    assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
    assertEquals(uid, licenseMetaData.getLicense().uid());
}

```

```

public void testExpiredSelfGeneratedBasicLicenseIsExtended() throws Exception {

```

```

long now = System.currentTimeMillis();
String uid = UUID.randomUUID().toString();
License.Builder builder = License.builder()
    .uid(uid)
    .issuedTo("name")
    .maxNodes(1000)
    .issueDate(dateMath("now-10h", now))
    .type("basic")
    .expiryDate(dateMath("now-2h", now));
License license = SelfGeneratedLicense.create(builder);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
assertEquals(uid, licenseMetaData.getLicense().uid());
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

```

```

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.CryptUtils.encrypt;
import static org.hamcrest.Matchers.equalTo;

public class SelfGeneratedLicenseTests extends ESTestCase {

    public void testBasic() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .maxNodes(5)
            .type(randomBoolean() ? "trial" : "basic")
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder);
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
    }

    public void testTampered() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")
            .type(randomBoolean() ? "trial" : "basic")
            .maxNodes(5)
            .issueDate(issueDate)
            .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
        License trialLicense = SelfGeneratedLicense.create(specBuilder);
        final String originalSignature = trialLicense.signature();
        License tamperedLicense = License.builder().fromLicenseSpec(trialLicense, originalSignature)
            .expiryDate(System.currentTimeMillis() + TimeValue.timeValueHours(5).getMillis())
            .build();
        assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
        assertThat(SelfGeneratedLicense.verify(tamperedLicense), equalTo(false));
    }

    public void testFrom1x() throws Exception {
        long issueDate = System.currentTimeMillis();
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("customer")

```

```

        .type("subscription")
        .subscriptionType("trial")
        .issuer("elasticsearch")
        .feature("")
        .version(License.VERSION_START)
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License pre20TrialLicense = specBuilder.build();
License license =
SelfGeneratedLicense.create(License.builder().fromPre20LicenseSpec(pre20TrialLicense).type("trial"));
    assertThat(SelfGeneratedLicense.verify(license), equalTo(true));
}

```

```

public void testTrialLicenseVerifyWithOlderVersion() throws Exception {
    long issueDate = System.currentTimeMillis();
    License.Builder specBuilder = License.builder()
        .issuedTo("customer")
        .maxNodes(5)
        .issueDate(issueDate)
        .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis())
        .feature("")
        .subscriptionType("trial")
        .version(1);
    License trialLicenseV1 = createTrialLicense(specBuilder);
    assertThat(SelfGeneratedLicense.verify(trialLicenseV1), equalTo(true));
}

```

```

private static License createTrialLicense(License.Builder specBuilder) {
    License spec = specBuilder
        .type(randomBoolean() ? "trial" : "basic")
        .issuer("elasticsearch")
        .uid(UUID.randomUUID().toString())
        .build();
    final String signature;
    try {
        XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
        spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
        byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
        byte[] bytes = new byte[4 + 4 + encrypt.length];
        ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
        byteBuffer.putInt(-spec.version())
            .putInt(encrypt.length)
            .put(encrypt);
        signature = Base64.getEncoder().encodeToString(bytes);
    } catch (IOException e) {
        throw new IllegalStateException(e);
    }
}

```

```

    }
    return License.builder().fromLicenseSpec(spec, signature).build();
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionFuture;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.elasticsearch.license.TestUtils.generateExpiredNonBasicLicense;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.not;

public class LicensesTransportTests extends ESSingleNodeTestCase {

    @Override
    protected boolean resetNodeAfterTest() {
        return true;
    }

    @Override
    protected Collection<Class<? extends Plugin>> getPlugins() {
        return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
    }

    @Override
    protected Settings nodeSettings() {
        Settings.Builder newSettings = Settings.builder();

```

```

newSettings.put(super.nodeSettings());
newSettings.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
// newSettings.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
// newSettings.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
newSettings.put(Node.NODE_DATA_SETTING.getKey(), true);
return newSettings.build();
}

public void testEmptyGetLicense() throws Exception {
    // basic license is added async, we should wait for it
    assertBusy(() -> {
        try {
            final ActionFuture<GetLicenseResponse> getLicenseFuture =
                new GetLicenseRequestBuilder(client().admin().cluster(), GetLicenseAction.INSTANCE).execute();
            final GetLicenseResponse getLicenseResponse;
            getLicenseResponse = getLicenseFuture.get();
            assertNotNull(getLicenseResponse.license());
            assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
        } catch (Exception e) {
            throw new RuntimeException("unexpected exception", e);
        }
    });
}

public void testPutLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // put license
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(signedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutLicenseFromString() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
    String licenseString = TestUtils.dumpLicense(signedLicense);

    // put license source
    PutLicenseRequestBuilder putLicenseRequestBuilder =

```

```

        new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE)
            .setLicense(new ByteArray(licenseString.getBytes(StandardCharsets.UTF_8)),
XContentType.JSON)
            .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

    // get and check license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutInvalidLicense() throws Exception {
    License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

    // modify content of signed license
    License tamperedLicense = License.builder()
        .fromLicenseSpec(signedLicense, signedLicense.signature())
        .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
        .validate()
        .build();

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(tamperedLicense);

    // try to put license (should be invalid)
    final PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

    // try to get invalid license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(tamperedLicense));
}

public void testPutBasicLicenseIsInvalid() throws Exception {
    License signedLicense = generateSignedLicense("basic", License.VERSION_CURRENT, -1,
TimeValue.timeValueMinutes(2));

    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(signedLicense);

    // try to put license (should be invalid)
    IllegalArgumentException iae = expectThrows(IllegalArgumentException.class, builder::get);

```



```

assertEquals(iae.getMessage(), "Registering basic licenses is not allowed.");

// try to get invalid license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), not(signedLicense));
}

public void testPutExpiredLicense() throws Exception {
    License expiredLicense = generateExpiredNonBasicLicense();
    PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
    builder.setLicense(expiredLicense);
    PutLicenseResponse putLicenseResponse = builder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.EXPIRED));
    // get license should not return the expired license
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), not(expiredLicense));
}

public void testPutLicensesSimple() throws Exception {
    License goldSignedLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldSignedLicense)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(goldSignedLicense));

    License platinumSignedLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(2));
    putLicenseRequestBuilder.setLicense(platinumSignedLicense);
    putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
    assertThat(getLicenseResponse.license(), equalTo(platinumSignedLicense));
}

public void testRemoveLicensesSimple() throws Exception {
    License goldLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldLicense)

```

```

        .setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(goldLicense));
// delete all licenses
DeleteLicenseRequestBuilder deleteLicenseRequestBuilder =
    new DeleteLicenseRequestBuilder(client().admin().cluster(), DeleteLicenseAction.INSTANCE);
DeleteLicenseResponse deleteLicenseResponse = deleteLicenseRequestBuilder.get();
assertThat(deleteLicenseResponse.isAcknowledged(), equalTo(true));
// get licenses (expected no licenses)
getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertNull(getLicenseResponse.license());
}

```

```

public void testLicenseIsRejectWhenStartDateLaterThanNow() throws Exception {

```

```

    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(dateMath("now+1h", now))
        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
    License license = TestUtils.generateSignedLicense(builder);

```

```

    PutLicenseRequestBuilder putLicenseRequestBuilder =
        new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
        .setAcknowledge(true);
    PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
    assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
    assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));
}

```

```

public void testLicenseIsAcceptedWhenStartDateBeforeThanNow() throws Exception {

```

```

    long now = System.currentTimeMillis();
    final License.Builder builder = License.builder()
        .uid(UUID.randomUUID().toString())
        .version(License.VERSION_CURRENT)
        .expiryDate(dateMath("now+2h", now))
        .startDate(now)

```

```

        .issueDate(now)
        .type(License.OperationMode.TRIAL.toString())
        .issuedTo("customer")
        .issuer("elasticsearch")
        .maxNodes(5);
License license = TestUtils.generateSignedLicense(builder);

PutLicenseRequestBuilder putLicenseRequestBuilder =
    new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
        .setAcknowledge(true);
PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
    }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.unit.TimeValue;

import java.net.InetAddress;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicenseTLSTests extends AbstractLicenseServiceTestCase {

    private InetAddress inetAddress;

    public void testApplyLicenseInDevMode() throws Exception {
        License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "platinum"),
TimeValue.timeValueHours(24L));
        PutLicenseRequest request = new PutLicenseRequest();

```

```

request.acknowledge(true);
request.license(newLicense);
Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
XPackLicenseState licenseState = new XPackLicenseState(settings);
inetAddress = InetAddress.getLoopbackAddress();

setInitialState(null, licenseState, settings);
licenseService.start();
PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
licenseService.registerLicense(request, responseFuture);
verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

inetAddress = TransportAddress.META_ADDRESS;
settings = Settings.builder()
    .put("xpack.security.enabled", true)
    .put("discovery.type", "single-node")
    .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

```

```

public void testApplyLicenseInProdMode() throws Exception {
    final String licenseType = randomFrom("GOLD", "PLATINUM");
    License newLicense = TestUtils.generateSignedLicense(licenseType, TimeValue.timeValueHours(24L));
    PutLicenseRequest request = new PutLicenseRequest();
    request.acknowledge(true);
    request.license(newLicense);
    Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
    XPackLicenseState licenseState = new XPackLicenseState(settings);
    inetAddress = TransportAddress.META_ADDRESS;

    setInitialState(null, licenseState, settings);
    licenseService.start();
    PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
    IllegalStateException e = expectThrows(IllegalStateException.class, () ->
licenseService.registerLicense(request, responseFuture));
    assertThat(e.getMessage(),
        containsString("Cannot install a [" + licenseType + "] license unless TLS is configured or security is
disabled"));

    settings = Settings.builder().put("xpack.security.enabled", false).build();
    licenseService.stop();
    licenseState = new XPackLicenseState(settings);
    setInitialState(null, licenseState, settings);
}

```

```

licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

settings = Settings.builder()
    .put("xpack.security.enabled", true)
    .put("xpack.security.transport.ssl.enabled", true)
    .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

@Override
protected DiscoveryNode getLocalNode() {
    return new DiscoveryNode("localnode", new TransportAddress(inetAddress, randomIntBetween(9300, 9399)),
        emptyMap(), emptySet(), Version.CURRENT);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.nio.charset.StandardCharsets;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;

import static org.hamcrest.core.IsEqual.equalTo;
import static org.hamcrest.core.IsNull.notNullValue;
import static org.hamcrest.core.IsNull.nullValue;

public class LicenseSerializationTests extends ESTestCase {

```

```

public void testSimpleIssueExpiryDate() throws Exception {
    long now = System.currentTimeMillis();
    String issueDate = TestUtils.dateMathString("now", now);
    String expiryDate = TestUtils.dateMathString("now+10d/d", now);
    String licenseSpecs = TestUtils.generateLicenseSpecString(new TestUtils.LicenseSpec(issueDate, expiryDate));
    License generatedLicense = License.fromSource(new
ByteArray(licenseSpecs.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
    assertThat(generatedLicense.issueDate(), equalTo(DateUtils.beginningOfDay(issueDate)));
    assertThat(generatedLicense.expiryDate(), equalTo(DateUtils.endOfDay(expiryDate)));
}

public void testLicensesFields() throws Exception {
    TestUtils.LicenseSpec randomLicenseSpec =
TestUtils.generateRandomLicenseSpec(License.VERSION_START);
    String licenseSpecsSource = TestUtils.generateLicenseSpecString(randomLicenseSpec);
    final License fromSource =
        License.fromSource(new ByteArray(licenseSpecsSource.getBytes(StandardCharsets.UTF_8)),
XContentType.JSON);
    TestUtils.assertLicenseSpec(randomLicenseSpec, fromSource);
}

public void testLicenseRestView() throws Exception {
    long now = System.currentTimeMillis();
    String expiredLicenseExpiryDate = TestUtils.dateMathString("now-1d/d", now);
    String validLicenseIssueDate = TestUtils.dateMathString("now-10d/d", now);
    String invalidLicenseIssueDate = TestUtils.dateMathString("now+1d/d", now);
    String validLicenseExpiryDate = TestUtils.dateMathString("now+2d/d", now);

    License license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
expiredLicenseExpiryDate));
    XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
    builder.flush();
    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();

    // should have an extra status field, human readable issue_data and expiry_date
    assertThat(map.get("status"), notNullValue());
    assertThat(map.get("issue_date"), notNullValue());
    assertThat(map.get("expiry_date"), notNullValue());
    assertThat(map.get("status"), equalTo("expired"));
    builder = XContentFactory.contentBuilder(XContentType.JSON);
    license.toXContent(builder, ToXContent.EMPTY_PARAMS);
    builder.flush();
    map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
    assertThat(map.get("status"), nullValue());
}

```

```

        license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
validLicenseExpiryDate));
        builder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
        builder.flush();
        map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

        // should have an extra status field, human readable issue_data and expiry_date
        assertThat(map.get("status"), notNullValue());
        assertThat(map.get("issue_date"), notNullValue());
        assertThat(map.get("expiry_date"), notNullValue());
        assertThat(map.get("status"), equalTo("active"));
        builder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.flush();
        map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
        assertThat(map.get("status"), nullValue());

        license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(invalidLicenseIssueDate,
validLicenseExpiryDate));
        builder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
        builder.flush();
        map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();

        // should have an extra status field, human readable issue_data and expiry_date
        assertThat(map.get("status"), notNullValue());
        assertThat(map.get("issue_date"), notNullValue());
        assertThat(map.get("expiry_date"), notNullValue());
        assertThat(map.get("status"), equalTo("invalid"));
        builder = XContentFactory.contentBuilder(XContentType.JSON);
        license.toXContent(builder, ToXContent.EMPTY_PARAMS);
        builder.flush();
        map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
        assertThat(map.get("status"), nullValue());
    }

    public void testLicenseRestViewNonExpiringBasic() throws Exception {
        long now = System.currentTimeMillis();

        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo("test")
            .maxNodes(1000)
            .issueDate(now)
            .type("basic")

```

```

        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
License license = SelfGeneratedLicense.create(specBuilder);
XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
builder.flush();
Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();

// should have an extra status field, human readable issue_data and no expiry_date
assertThat(map.get("status"), notNullValue());
assertThat(map.get("type"), equalTo("basic"));
assertThat(map.get("issue_date"), notNullValue());
assertThat(map.get("expiry_date"), nullValue());
assertThat(map.get("expiry_date_in_millis"), nullValue());
assertThat(map.get("status"), equalTo("active"));
builder = XContentFactory.contentBuilder(XContentType.JSON);
license.toXContent(builder, ToXContent.EMPTY_PARAMS);
builder.flush();
map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
assertThat(map.get("status"), nullValue());
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

```



```

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartBasicLicenseTests extends AbstractLicensesIntegrationTestCase {

    @Override
    protected Settings nodeSettings(int nodeOrdinal) {
        return Settings.builder()
            .put(super.nodeSettings(nodeOrdinal))
            .put("node.data", true)
            .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
            .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
    }

    @Override
    protected Collection<Class<? extends Plugin>> nodePlugins() {
        return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
    }

    @Override
    protected Collection<Class<? extends Plugin>> transportClientPlugins() {
        return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
    }

    public void testStartBasicLicense() throws Exception {
        LicensingClient licensingClient = new LicensingClient(client());
        License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
        licensingClient.preparePutLicense(license).get();

        assertBusy(() -> {
            GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
            assertEquals("trial", getLicenseResponse.license().type());
        });

        // Testing that you can start a basic license when you have no license
        if (randomBoolean()) {
            licensingClient.prepareDeleteLicense().get();
            assertNull(licensingClient.prepareGetLicense().get().license());
        }

        RestClient restClient = getRestClient();
        Response response = restClient.performRequest("GET", "/_xpack/license/basic_status");
        String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
        assertEquals(200, response.getStatusLine().getStatusCode());
        assertEquals("{\"eligible_to_start_basic\":true}", body);
    }
}

```

```

Response response2 = restClient.performRequest("POST", "/_xpack/license/start_basic?acknowledge=true");
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"acknowledged\":true"));
assertTrue(body2.contains("\"basic_was_started\":true"));

assertBusy(() -> {
    GetLicenseResponse currentLicense = licensingClient.prepareGetLicense().get();
    assertEquals("basic", currentLicense.license().type());
});

long expirationMillis = licensingClient.prepareGetLicense().get().license().expiryDate();
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
expirationMillis);

Response response3 = restClient.performRequest("GET", "/_xpack/license");
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertTrue(body3.contains("\"type\" : \"basic\""));
assertFalse(body3.contains("expiry_date"));
assertFalse(body3.contains("expiry_date_in_millis"));

Response response4 = restClient.performRequest("GET", "/_xpack/license/basic_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_basic\":false}", body4);

ResponseException ex = expectThrows(ResponseException.class,
    () -> restClient.performRequest("POST", "/_xpack/license/start_basic"));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"basic_was_started\":false"));
assertTrue(body5.contains("\"acknowledged\":true"));
assertTrue(body5.contains("\"error_message\": \"Operation failed: Current license is basic.\""));
}

public void testUnacknowledgedStartBasicLicense() throws Exception {
    LicensingClient licensingClient = new LicensingClient(client());
    License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
    licensingClient.preparePutLicense(license).get();

    assertBusy(() -> {

```

```

        GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
        assertEquals("trial", getLicenseResponse.license().type());
    });

    Response response2 = getRestClient().performRequest("POST", "/_xpack/license/start_basic");
    String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
    assertEquals(200, response2.getStatusLine().getStatusCode());
    assertTrue(body2.contains("\"acknowledged\":false"));
    assertTrue(body2.contains("\"basic_was_started\":false"));
    assertTrue(body2.contains("\"error_message\":\"Operation failed: Needs acknowledgement.\""));
    assertTrue(body2.contains("\"message\":\"This license update requires acknowledgement. To acknowledge the
license, " +
        "please read the following messages and call /start_basic again, this time with the
\\\"acknowledge=true\\\""));
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.BytesStreamOutput;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.hamcrest.Matchers.sameInstance;

public class PutLicenseResponseTests extends ESTestCase {
    @SuppressWarnings("unchecked")
    public void testSerialization() throws Exception {
        boolean acknowledged = randomBoolean();
        LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,

```

```

LicensesStatus.EXPIRED);
    Map<String, String[]> ackMessages = randomAckMessages();

    PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);

    XContentBuilder contentBuilder = XContentFactory.jsonBuilder();
    response.toXContent(contentBuilder, ToXContent.EMPTY_PARAMS);

    Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(contentBuilder), false,
        contentBuilder.contentType().v2());
    assertThat(map.containsKey("acknowledged"), equalTo(true));
    boolean actualAcknowledged = (boolean) map.get("acknowledged");
    assertThat(actualAcknowledged, equalTo(acknowledged));

    assertThat(map.containsKey("license_status"), equalTo(true));
    String actualStatus = (String) map.get("license_status");
    assertThat(actualStatus, equalTo(status.name().toLowerCase(Locale.ROOT)));

    assertThat(map.containsKey("acknowledge"), equalTo(true));
    Map<String, List<String>> actualAckMessages = (Map<String, List<String>>) map.get("acknowledge");
    assertTrue(actualAckMessages.containsKey("message"));
    actualAckMessages.remove("message");
    assertThat(actualAckMessages.keySet(), equalTo(ackMessages.keySet()));
    for (Map.Entry<String, List<String>> entry : actualAckMessages.entrySet()) {
        assertThat(entry.getValue().toArray(), equalTo(ackMessages.get(entry.getKey())));
    }
}

public void testStreamSerialization() throws IOException {
    boolean acknowledged = randomBoolean();
    LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
    Map<String, String[]> ackMessages = randomAckMessages();

    // write the steam so that we can attempt to read it back
    ByteArrayOutputStream output = new ByteArrayOutputStream();

    PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);
    // write it out
    response.writeTo(output);

    StreamInput input = output.bytes().streamInput();

    // read it back in
    response.readFrom(input);

    assertThat(response.isAcknowledged(), equalTo(acknowledged));
    assertThat(response.status(), equalTo(status));
}

```

```

assertThat(response.acknowledgeMessages(), not(sameInstance(ackMessages)));
assertThat(response.acknowledgeMessages().size(), equalTo(ackMessages.size()));

for (String key : ackMessages.keySet()) {
    assertThatEquals(ackMessages.get(key), response.acknowledgeMessages().get(key));
}
}

private static Map<String, String[]> randomAckMessages() {
    int nFeatures = randomIntBetween(1, 5);

    Map<String, String[]> ackMessages = new HashMap<>();

    for (int i = 0; i < nFeatures; i++) {
        String feature = randomAlphaOfLengthBetween(9, 15);
        int nMessages = randomIntBetween(1, 5);
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = randomAlphaOfLengthBetween(10, 30);
        }
        ackMessages.put(feature, messages);
    }

    return ackMessages;
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlocks;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.watcher.watch.ClockMock;

```

```

import org.junit.After;
import org.junit.Before;

import java.nio.file.Path;
import java.util.Arrays;

import static java.util.Collections.emptySet;
import static java.util.Collections.singletonMap;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

public abstract class AbstractLicenseServiceTestCase extends ESTestCase {

    protected LicenseService licenseService;
    protected ClusterService clusterService;
    protected ResourceWatcherService resourceWatcherService;
    protected ClockMock clock;
    protected DiscoveryNodes discoveryNodes;
    protected Environment environment;
    protected String licenseType;

    @Before
    public void init() throws Exception {
        clusterService = mock(ClusterService.class);
        clock = ClockMock.frozen();
        discoveryNodes = mock(DiscoveryNodes.class);
        resourceWatcherService = mock(ResourceWatcherService.class);
        environment = mock(Environment.class);
    }

    protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings) {
        setInitialState(license, licenseState, settings, randomBoolean() ? "trial" : "basic");
    }

    protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings, String
selfGeneratedType) {
        Path tempDir = createTempDir();
        when(environment.configFile()).thenReturn(tempDir);
        licenseType = selfGeneratedType;
        settings =
Settings.builder().put(settings).put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(),
licenseType).build();
        licenseService = new LicenseService(settings, clusterService, clock, environment, resourceWatcherService,
licenseState);
        ClusterState state = mock(ClusterState.class);
        final ClusterBlocks noBlock = ClusterBlocks.builder().build();
        when(state.blocks()).thenReturn(noBlock);
        Metadata metaData = mock(Metadata.class);

```

```

        when(metaData.custom(LicensesMetaData.TYPE)).thenReturn(new LicensesMetaData(license, null));
        when(state.metaData()).thenReturn(metaData);
        final DiscoveryNode mockNode = getLocalNode();
        when(discoveryNodes.getMasterNode()).thenReturn(mockNode);
        when(discoveryNodes.splitIterator()).thenReturn(Arrays.asList(mockNode).splitIterator());
        when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(false);
        when(state.nodes()).thenReturn(discoveryNodes);
        when(state.getNodes()).thenReturn(discoveryNodes); // it is really ridiculous we have nodes() and getNodes()...
        when(clusterService.state()).thenReturn(state);
        when(clusterService.lifecycleState()).thenReturn(Lifecycle.State.STARTED);
        when(clusterService.getClusterName()).thenReturn(new ClusterName("a"));
        when(clusterService.localNode()).thenReturn(mockNode);
    }

    protected DiscoveryNode getLocalNode() {
        return new DiscoveryNode("b", buildNewFakeTransportAddress(),
            singletonMap(XPackPlugin.XPACK_INSTALLED_NODE_ATTR, "true"),
            emptySet(), Version.CURRENT);
    }

    @After
    public void tearDown() throws Exception {
        super.tearDown();
        licenseService.stop();
    }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.function.Predicate;

/**
 * A permissions that is based on a general privilege that contains patterns of users that this
 * user can execute a request as
 */
public final class RunAsPermission {

    public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

    private final Predicate<String> predicate;

    RunAsPermission(Privilege privilege) {

```

```

        this.predicate = privilege.predicate();
    }

    /**
     * Checks if this permission grants run as to the specified user
     */
    public boolean check(String username) {
        return predicate.test(username);
    }
}

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;

public final class Role {

    public static final Role EMPTY = Role.builder("__empty").build();

    private final String[] names;
    private final ClusterPermission cluster;
    private final IndicesPermission indices;
    private final RunAsPermission runAs;

    Role(String[] names, ClusterPermission cluster, IndicesPermission indices, RunAsPermission runAs) {
        this.names = names;
        this.cluster = Objects.requireNonNull(cluster);
        this.indices = Objects.requireNonNull(indices);
        this.runAs = Objects.requireNonNull(runAs);
    }
}

```



```

}

public String[] names() {
    return names;
}

public ClusterPermission cluster() {
    return cluster;
}

public IndicesPermission indices() {
    return indices;
}

public RunAsPermission runAs() {
    return runAs;
}

public static Builder builder(String... names) {
    return new Builder(names, null);
}

public static Builder builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(names, fieldPermissionsCache);
}

public static Builder builder(RoleDescriptor rd, FieldPermissionsCache fieldPermissionsCache) {
    return new Builder(rd, fieldPermissionsCache);
}

/**
 * Returns whether at least one group encapsulated by this indices permissions is authorized to execute the
 * specified action with the requested indices/aliases. At the same time if field and/or document level security
 * is configured for any group also the allowed fields and role queries are resolved.
 */
public IndicesAccessControl authorize(String action, Set<String> requestedIndicesOrAliases, MetaData
metaData,
                                FieldPermissionsCache fieldPermissionsCache) {
    Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = indices.authorize(
        action, requestedIndicesOrAliases, metaData, fieldPermissionsCache
    );

    // At least one role / indices permission set need to match with all the requested indices/aliases:
    boolean granted = true;
    for (Map.Entry<String, IndicesAccessControl.IndexAccessControl> entry : indexPermissions.entrySet()) {
        if (!entry.getValue().isGranted()) {
            granted = false;
            break;
        }
    }
}

```

```

    }
}
return new IndicesAccessControl(allowed, indexPermissions);
}

public static class Builder {

    private final String[] names;
    private ClusterPermission cluster = ClusterPermission.NONE;
    private RunAsPermission runAs = RunAsPermission.NONE;
    private List<IndicesPermission.Group> groups = new ArrayList<>();
    private FieldPermissionsCache fieldPermissionsCache = null;

    private Builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
        this.names = names;
        this.fieldPermissionsCache = fieldPermissionsCache;
    }

    private Builder(RoleDescriptor rd, @Nullable FieldPermissionsCache fieldPermissionsCache) {
        this.names = new String[] { rd.getName() };
        this.fieldPermissionsCache = fieldPermissionsCache;
        if (rd.getClusterPrivileges().length == 0) {
            cluster = ClusterPermission.NONE;
        } else {
            this.cluster(ClusterPrivilege.get(Sets.newHashSet(rd.getClusterPrivileges())));
        }
        groups.addAll(convertFromIndicesPrivileges(rd.getIndicesPrivileges(), fieldPermissionsCache));
        String[] rdRunAs = rd.getRunAs();
        if (rdRunAs != null && rdRunAs.length > 0) {
            this.runAs(new Privilege(Sets.newHashSet(rdRunAs), rdRunAs));
        }
    }

    public Builder cluster(ClusterPrivilege privilege) {
        cluster = new ClusterPermission(privilege);
        return this;
    }

    public Builder runAs(Privilege privilege) {
        runAs = new RunAsPermission(privilege);
        return this;
    }

    public Builder add(IndexPrivilege privilege, String... indices) {
        groups.add(new IndicesPermission.Group(privilege, FieldPermissions.DEFAULT, null, indices));
        return this;
    }
}

```

```

    public Builder add(FieldPermissions fieldPermissions, Set<BytesReference> query, IndexPrivilege privilege,
String... indices) {
        groups.add(new IndicesPermission.Group(privilege, fieldPermissions, query, indices));
        return this;
    }

    public Role build() {
        IndicesPermission indices = groups.isEmpty() ? IndicesPermission.NONE :
            new IndicesPermission(groups.toArray(new IndicesPermission.Group[groups.size()]));
        return new Role(names, cluster, indices, runAs);
    }

    static List<IndicesPermission.Group> convertFromIndicesPrivileges(RoleDescriptor.IndicesPrivileges[]
indicesPrivileges,
                                @Nullable FieldPermissionsCache fieldPermissionsCache) {
        List<IndicesPermission.Group> list = new ArrayList<>(indicesPrivileges.length);
        for (RoleDescriptor.IndicesPrivileges privilege : indicesPrivileges) {
            final FieldPermissions fieldPermissions;
            if (fieldPermissionsCache != null) {
                fieldPermissions = fieldPermissionsCache.getFieldPermissions(privilege.getGrantedFields(),
privilege.getDeniedFields());
            } else {
                fieldPermissions = new FieldPermissions(
                    new FieldPermissionsDefinition(privilege.getGrantedFields(), privilege.getDeniedFields()));
            }
            final Set<BytesReference> query = privilege.getQuery() == null ? null :
Collections.singleton(privilege.getQuery());
            list.add(new IndicesPermission.Group(IndexPrivilege.get(Sets.newHashSet(privilege.getPrivileges())),
                fieldPermissions,
                query,
                privilege.getIndices()));
        }
        return list;
    }
}
}
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.common.cache.Cache;
import org.elasticsearch.common.cache.CacheBuilder;

```

```

import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Setting.Property;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.Collection;
import java.util.List;
import java.util.Optional;
import java.util.Set;
import java.util.concurrent.ExecutionException;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.xpack.core.security.SecurityField.setting;

/**
 * A service for managing the caching of {@link FieldPermissions} as these may often need to be combined or
 * created and internally they
 * use an {@link org.apache.lucene.util.automaton.Automaton}, which can be costly to create once you account for
 * minimization
 */
public final class FieldPermissionsCache {

    public static final Setting<Long> CACHE_SIZE_SETTING = Setting.longSetting(
        setting("authz.store.roles.field_permissions.cache.max_size_in_bytes"), 100 * 1024 * 1024, -1L,
        Property.NodeScope);
    private final Cache<FieldPermissionsDefinition, FieldPermissions> cache;

    public FieldPermissionsCache(Settings settings) {
        this.cache = CacheBuilder.<FieldPermissionsDefinition, FieldPermissions>builder()
            .setMaximumWeight(CACHE_SIZE_SETTING.get(settings))
            .weigher((key, fieldPermissions) -> fieldPermissions.ramBytesUsed())
            .build();
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
     * may come from the cache
     * or if it gets created, the instance will be cached
     */
    FieldPermissions getFieldPermissions(String[] granted, String[] denied) {
        return getFieldPermissions(new FieldPermissionsDefinition(granted, denied));
    }

    /**
     * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
     * may come from the cache

```

```

* or if it gets created, the instance will be cached
*/
public FieldPermissions getFieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
    try {
        return cache.computeIfAbsent(fieldPermissionsDefinition,
            (key) -> new FieldPermissions(key, FieldPermissions.initializePermittedFieldsAutomaton(key)));
    } catch (ExecutionException e) {
        throw new ElasticsearchException("unable to compute field permissions", e);
    }
}

/**
 * Returns a field permissions object that corresponds to the merging of the given field permissions and caches the
instance if one was
 * not found in the cache.
 */
FieldPermissions getFieldPermissions(Collection<FieldPermissions> fieldPermissionsCollection) {
    Optional<FieldPermissions> allowAllFieldPermissions = fieldPermissionsCollection.stream()
        .filter(((Predicate<FieldPermissions>) (FieldPermissions::hasFieldLevelSecurity)).negate())
        .findFirst();
    return allowAllFieldPermissions.orElseGet(() -> {
        final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups = fieldPermissionsCollection.stream()
            .flatMap(fieldPermission ->
fieldPermission.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream())
            .collect(Collectors.toSet());
        final FieldPermissionsDefinition combined = new FieldPermissionsDefinition(fieldGrantExcludeGroups);
        try {
            return cache.computeIfAbsent(combined, (key) -> {
                List<Automaton> automatonList = fieldPermissionsCollection.stream()
                    .map(FieldPermissions::getIncludeAutomaton)
                    .collect(Collectors.toList());
                return new FieldPermissions(key, Automatons.unionAndMinimize(automatonList));
            });
        } catch (ExecutionException e) {
            throw new ElasticsearchException("unable to compute field permissions", e);
        }
    });
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.TooComplexToDetermineException;

```

```

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.cluster.metadata.AliasOrIndex;
import org.elasticsearch.cluster.metadata.IndexMetaData;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.Iterator;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;
import java.util.SortedMap;
import java.util.concurrent.ConcurrentHashMap;
import java.util.function.Function;
import java.util.function.Predicate;

import static java.util.Collections.unmodifiableMap;
import static java.util.Collections.unmodifiableSet;

/**
 * A permission that is based on privileges for index related actions executed
 * on specific indices
 */
public final class IndicesPermission implements Iterable<IndicesPermission.Group> {

    public static final IndicesPermission NONE = new IndicesPermission();

    private final Function<String, Predicate<String>> loadingFunction;

    private final ConcurrentHashMap<String, Predicate<String>> allowedIndicesMatchersForAction = new
    ConcurrentHashMap<>();

    private final Group[] groups;

    public IndicesPermission(Group... groups) {
        this.groups = groups;
        loadingFunction = (action) -> {
            List<String> indices = new ArrayList<>();

```

```

    for (Group group : groups) {
        if (group.actionMatcher.test(action)) {
            indices.addAll(Arrays.asList(group.indices));
        }
    }
    return indexMatcher(indices);
};
}

static Predicate<String> indexMatcher(List<String> indices) {
    try {
        return Automaton.predicate(indices);
    } catch (TooComplexToDeterminizeException e) {
        Loggers.getLogger(IndicesPermission.class).debug("Index pattern automaton [{}] is too complex", indices);
        String description = Strings.collectionToCommaDelimitedString(indices);
        if (description.length() > 80) {
            description = Strings.cleanTruncate(description, 80) + "...";
        }
        throw new ElasticsearchSecurityException("The set of permitted index patterns [{}] is too complex to
evaluate", e, description);
    }
}

@Override
public Iterator<Group> iterator() {
    return Arrays.asList(groups).iterator();
}

public Group[] groups() {
    return groups;
}

/**
 * @return A predicate that will match all the indices that this permission
 * has the privilege for executing the given action on.
 */
public Predicate<String> allowedIndicesMatcher(String action) {
    return allowedIndicesMatchersForAction.computeIfAbsent(action, loadingFunction);
}

/**
 * Checks if the permission matches the provided action, without looking at indices.
 * To be used in very specific cases where indices actions need to be authorized regardless of their indices.
 * The usecase for this is composite actions that are initially only authorized based on the action name (indices are
not
 * checked on the coordinating node), and properly authorized later at the shard level checking their indices as
well.
 */

```

```

public boolean check(String action) {
    for (Group group : groups) {
        if (group.check(action)) {
            return true;
        }
    }
    return false;
}

public Automaton allowedActionsMatcher(String index) {
    List<Automaton> automatonList = new ArrayList<>();
    for (Group group : groups) {
        if (group.indexNameMatcher.test(index)) {
            automatonList.add(group.privilege.getAutomaton());
        }
    }
    return automatonList.isEmpty() ? Automatons.EMPTY : Automatons.unionAndMinimize(automatonList);
}

/**
 * Authorizes the provided action against the provided indices, given the current cluster metadata
 */
public Map<String, IndicesAccessControl.IndexAccessControl> authorize(String action, Set<String>
requestedIndicesOrAliases,
                                Metadata metaData, FieldPermissionsCache fieldPermissionsCache) {
    // now... every index that is associated with the request, must be granted
    // by at least one indices permission group

    SortedMap<String, AliasOrIndex> allAliasesAndIndices = metaData.getAliasAndIndexLookup();
    Map<String, Set<FieldPermissions>> fieldPermissionsByIndex = new HashMap<>();
    Map<String, DocumentLevelPermissions> roleQueriesByIndex = new HashMap<>();
    Map<String, Boolean> grantedBuilder = new HashMap<>();

    for (String indexOrAlias : requestedIndicesOrAliases) {
        boolean granted = false;
        Set<String> concreteIndices = new HashSet<>();
        AliasOrIndex aliasOrIndex = allAliasesAndIndices.get(indexOrAlias);
        if (aliasOrIndex != null) {
            for (IndexMetaData indexMetaData : aliasOrIndex.getIndices()) {
                concreteIndices.add(indexMetaData.getIndex().getName());
            }
        }
    }

    for (Group group : groups) {
        if (group.check(action, indexOrAlias)) {
            granted = true;
            for (String index : concreteIndices) {
                Set<FieldPermissions> fieldPermissions = fieldPermissionsByIndex.computeIfAbsent(index, (k) ->

```



```

new HashSet<>());
    fieldPermissionsByIndex.put(indexOrAlias, fieldPermissions);
    fieldPermissions.add(group.getFieldPermissions());
    DocumentLevelPermissions permissions =
        roleQueriesByIndex.computeIfAbsent(index, (k) -> new DocumentLevelPermissions());
    roleQueriesByIndex.putIfAbsent(indexOrAlias, permissions);
    if (group.hasQuery()) {
        permissions.addAll(group.getQuery());
    } else {
        // if more than one permission matches for a concrete index here and if
        // a single permission doesn't have a role query then DLS will not be
        // applied even when other permissions do have a role query
        permissions.setAllowAll(true);
    }
}
}
}

if (concreteIndices.isEmpty()) {
    grantedBuilder.put(indexOrAlias, granted);
} else {
    grantedBuilder.put(indexOrAlias, granted);
    for (String concreteIndex : concreteIndices) {
        grantedBuilder.put(concreteIndex, granted);
    }
}
}

Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = new HashMap<>();
for (Map.Entry<String, Boolean> entry : grantedBuilder.entrySet()) {
    String index = entry.getKey();
    DocumentLevelPermissions permissions = roleQueriesByIndex.get(index);
    final Set<BytesReference> roleQueries;
    if (permissions != null && permissions.isAllowAll() == false) {
        roleQueries = unmodifiableSet(permissions.queries);
    } else {
        roleQueries = null;
    }

    final FieldPermissions fieldPermissions;
    final Set<FieldPermissions> indexFieldPermissions = fieldPermissionsByIndex.get(index);
    if (indexFieldPermissions != null && indexFieldPermissions.isEmpty() == false) {
        fieldPermissions = indexFieldPermissions.size() == 1 ? indexFieldPermissions.iterator().next() :
            fieldPermissionsCache.getFieldPermissions(indexFieldPermissions);
    } else {
        fieldPermissions = FieldPermissions.DEFAULT;
    }
    indexPermissions.put(index, new IndicesAccessControl.IndexAccessControl(entry.getValue(),

```

```

fieldPermissions, roleQueries));
    }
    return unmodifiableMap(indexPermissions);
}

public static class Group {
    private final IndexPrivilege privilege;
    private final Predicate<String> actionMatcher;
    private final String[] indices;
    private final Predicate<String> indexNameMatcher;

    public FieldPermissions getFieldPermissions() {
        return fieldPermissions;
    }

    private final FieldPermissions fieldPermissions;
    private final Set<BytesReference> query;

    public Group(IndexPrivilege privilege, FieldPermissions fieldPermissions, @Nullable Set<BytesReference>
query, String... indices) {
        assert indices.length != 0;
        this.privilege = privilege;
        this.actionMatcher = privilege.predicate();
        this.indices = indices;
        this.indexNameMatcher = indexMatcher(Arrays.asList(indices));
        this.fieldPermissions = Objects.requireNonNull(fieldPermissions);
        this.query = query;
    }

    public IndexPrivilege privilege() {
        return privilege;
    }

    public String[] indices() {
        return indices;
    }

    @Nullable
    public Set<BytesReference> getQuery() {
        return query;
    }

    private boolean check(String action) {
        return actionMatcher.test(action);
    }

    private boolean check(String action, String index) {
        assert index != null;

```

```

        return check(action) && indexNameMatcher.test(index);
    }

    boolean hasQuery() {
        return query != null;
    }
}

private static class DocumentLevelPermissions {

    private Set<BytesReference> queries = null;
    private boolean allowAll = false;

    private void addAll(Set<BytesReference> query) {
        if (allowAll == false) {
            if (queries == null) {
                queries = new HashSet<>();
            }
            queries.addAll(query);
        }
    }

    private boolean isAllowAll() {
        return allowAll;
    }

    private void setAllowAll(boolean allowAll) {
        this.allowAll = allowAll;
    }
}
}
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.index.DirectoryReader;
import org.apache.lucene.util.Accountable;
import org.apache.lucene.util.RamUsageEstimator;
import org.apache.lucene.util.automaton.Automata;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.CharacterRunAutomaton;
import org.apache.lucene.util.automaton.MinimizationOperations;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.common.Strings;

```

```

import org.elasticsearch.common.regex.Regex;
import org.elasticsearch.index.mapper.AllFieldMapper;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.FieldSubsetReader;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;

import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 * 2. it must not match the patterns in deniedFieldsArray
 */
public final class FieldPermissions implements Accountable {

    public static final FieldPermissions DEFAULT = new FieldPermissions();

    private static final long BASE_FIELD_PERM_DEF_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldPermissionsDefinition(null, null));
    private static final long BASE_FIELD_GROUP_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldGrantExcludeGroup(null, null));
    private static final long BASE_HASHSET_SIZE = RamUsageEstimator.shallowSizeOfInstance(HashSet.class);
    private static final long BASE_HASHSET_ENTRY_SIZE;
    static {
        HashMap<String, Object> map = new HashMap<>();
        map.put(FieldPermissions.class.getName(), new Object());
        long mapEntryShallowSize = RamUsageEstimator.shallowSizeOf(map.entrySet().iterator().next());
        // assume a load factor of 50%
        // for each entry, we need two object refs, one for the entry itself
        // and one for the free space that is due to the fact hash tables can
        // not be fully loaded
        BASE_HASHSET_ENTRY_SIZE = mapEntryShallowSize + 2 *
RamUsageEstimator.NUM_BYTES_OBJECT_REF;
    }
}

```

```

private final FieldPermissionsDefinition fieldPermissionsDefinition;
// an automaton that represents a union of one more sets of permitted and denied fields
private final CharacterRunAutomaton permittedFieldsAutomaton;
private final boolean permittedFieldsAutomatonIsTotal;
private final Automaton originalAutomaton;

private final long ramBytesUsed;

/** Constructor that does not enable field-level security: all fields are accepted. */
public FieldPermissions() {
    this(new FieldPermissionsDefinition(null, null), Automatons.MATCH_ALL);
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
public FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
    this(fieldPermissionsDefinition, initializePermittedFieldsAutomaton(fieldPermissionsDefinition));
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition, Automaton permittedFieldsAutomaton)
{
    if (permittedFieldsAutomaton.isDeterministic() == false && permittedFieldsAutomaton.getNumStates() > 1) {
        // we only accept deterministic automata so that the CharacterRunAutomaton constructor
        // directly wraps the provided automata
        throw new IllegalArgumentException("Only accepts deterministic automata");
    }
    this.fieldPermissionsDefinition = fieldPermissionsDefinition;
    this.originalAutomaton = permittedFieldsAutomaton;
    this.permittedFieldsAutomaton = new CharacterRunAutomaton(permittedFieldsAutomaton);
    // we cache the result of isTotal since this might be a costly operation
    this.permittedFieldsAutomatonIsTotal = Operations.isTotal(permittedFieldsAutomaton);

    long ramBytesUsed = BASE_FIELD_PERM_DEF_BYTES;

    for (FieldGrantExcludeGroup group : fieldPermissionsDefinition.getFieldGrantExcludeGroups()) {
        ramBytesUsed += BASE_FIELD_GROUP_BYTES + BASE_HASHSET_ENTRY_SIZE;
        if (group.getGrantedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getGrantedFields());
        }
        if (group.getExcludedFields() != null) {
            ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getExcludedFields());
        }
    }
    ramBytesUsed += permittedFieldsAutomaton.ramBytesUsed();
    ramBytesUsed += runAutomatonRamBytesUsed(permittedFieldsAutomaton);
    this.ramBytesUsed = ramBytesUsed;
}

```

```

}

/**
 * Return an estimation of the ram bytes used by a {@link CharacterRunAutomaton}
 * that wraps the given automaton.
 */
private static long runAutomatonRamBytesUsed(Automaton a) {
    return a.getNumStates() * 5; // wild guess, better than 0
}

public static Automaton initializePermittedFieldsAutomaton(FieldPermissionsDefinition
fieldPermissionsDefinition) {
    Set<FieldGrantExcludeGroup> groups = fieldPermissionsDefinition.getFieldGrantExcludeGroups();
    assert groups.size() > 0 : "there must always be a single group for field inclusion/exclusion";
    List<Automaton> automatonList =
        groups.stream()
            .map(g -> FieldPermissions.initializePermittedFieldsAutomaton(g.getGrantedFields(),
g.getExcludedFields()))
            .collect(Collectors.toList());
    return Automatons.unionAndMinimize(automatonList);
}

private static Automaton initializePermittedFieldsAutomaton(final String[] grantedFields, final String[]
deniedFields) {
    Automaton grantedFieldsAutomaton;
    if (grantedFields == null || Arrays.stream(grantedFields).anyMatch(Regex::isMatchAllPattern)) {
        grantedFieldsAutomaton = Automatons.MATCH_ALL;
    } else {
        // an automaton that includes metadata fields, including join fields created by the _parent field such
        // as _parent#type
        Automaton metaFieldsAutomaton = Operations.concatenate(Automata.makeChar('_'),
Automata.makeAnyString());
        grantedFieldsAutomaton = Operations.union(Automatons.patterns(grantedFields), metaFieldsAutomaton);
    }

    Automaton deniedFieldsAutomaton;
    if (deniedFields == null || deniedFields.length == 0) {
        deniedFieldsAutomaton = Automatons.EMPTY;
    } else {
        deniedFieldsAutomaton = Automatons.patterns(deniedFields);
    }

    grantedFieldsAutomaton = MinimizationOperations.minimize(grantedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);
    deniedFieldsAutomaton = MinimizationOperations.minimize(deniedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);

    if (subsetOf(deniedFieldsAutomaton, grantedFieldsAutomaton) == false) {

```

```

        throw new ElasticsearchSecurityException("Exceptions for field permissions must be a subset of the " +
            "granted fields but " + Strings.arrayToCommaDelimitedString(deniedFields) + " is not a subset of " +
            Strings.arrayToCommaDelimitedString(allowedFields));
    }

    if (!containsAllField(allowedFields) && !containsAllField(deniedFields)) {
        // It is not explicitly stated whether _all should be allowed/denied
        // In that case we automatically disable _all, unless all fields would match
        if (Operations.isTotal(allowedFieldsAutomaton) && Operations.isEmpty(deniedFieldsAutomaton)) {
            // all fields are accepted, so using _all is fine
        } else {
            deniedFieldsAutomaton = Operations.union(deniedFieldsAutomaton,
Automata.makeString(AllFieldMapper.NAME));
        }
    }

    grantedFieldsAutomaton = Automatons.minusAndMinimize(allowedFieldsAutomaton,
deniedFieldsAutomaton);
    return grantedFieldsAutomaton;
}

private static boolean containsAllField(String[] fields) {
    return fields != null && Arrays.stream(fields).anyMatch(AllFieldMapper.NAME::equals);
}

/**
 * Returns true if this field permission policy allows access to the field and false if not.
 * fieldName can be a wildcard.
 */
public boolean grantsAccessTo(String fieldName) {
    return permittedFieldsAutomatonIsTotal || permittedFieldsAutomaton.run(fieldName);
}

FieldPermissionsDefinition getFieldPermissionsDefinition() {
    return fieldPermissionsDefinition;
}

/** Return whether field-level security is enabled, ie. whether any field might be filtered out. */
public boolean hasFieldLevelSecurity() {
    return permittedFieldsAutomatonIsTotal == false;
}

/** Return a wrapped reader that only exposes allowed fields. */
public DirectoryReader filter(DirectoryReader reader) throws IOException {
    if (hasFieldLevelSecurity() == false) {
        return reader;
    }
    return FieldSubsetReader.wrap(reader, permittedFieldsAutomaton);
}

```

```

    }

    // for testing only
    Automaton getIncludeAutomaton() {
        return originalAutomaton;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;

        FieldPermissions that = (FieldPermissions) o;

        if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
        return fieldPermissionsDefinition != null ?
            fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
null;
    }

    @Override
    public int hashCode() {
        int result = fieldPermissionsDefinition != null ? fieldPermissionsDefinition.hashCode() : 0;
        result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
        return result;
    }

    @Override
    public long ramBytesUsed() {
        return ramBytesUsed;
    }
}

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;

import java.util.function.Predicate;

/**
 * A permission that is based on privileges for cluster wide actions
 */
public final class ClusterPermission {

```



```

public static final ClusterPermission NONE = new ClusterPermission(ClusterPrivilege.NONE);

private final ClusterPrivilege privilege;
private final Predicate<String> predicate;

ClusterPermission(ClusterPrivilege privilege) {
    this.privilege = privilege;
    this.predicate = privilege.predicate();
}

public ClusterPrivilege privilege() {
    return privilege;
}

public boolean check(String action) {
    return predicate.test(action);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import java.util.Arrays;
import java.util.Collections;
import java.util.Set;

/**
 * Represents the definition of a {@link FieldPermissions}. Field permissions are defined as a
 * collections of grant and exclude definitions where the exclude definition must be a subset of
 * the grant definition.
 */
public final class FieldPermissionsDefinition {

    private final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups;

    public FieldPermissionsDefinition(String[] grant, String[] exclude) {
        this(Collections.singleton(new FieldGrantExcludeGroup(grant, exclude)));
    }

    public FieldPermissionsDefinition(Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups) {
        this.fieldGrantExcludeGroups = Collections.unmodifiableSet(fieldGrantExcludeGroups);
    }

    public Set<FieldGrantExcludeGroup> getFieldGrantExcludeGroups() {
        return fieldGrantExcludeGroups;
    }
}

```

```

}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    FieldPermissionsDefinition that = (FieldPermissionsDefinition) o;

    return fieldGrantExcludeGroups != null ?
        fieldGrantExcludeGroups.equals(that.fieldGrantExcludeGroups) :
        that.fieldGrantExcludeGroups == null;
}

@Override
public int hashCode() {
    return fieldGrantExcludeGroups != null ? fieldGrantExcludeGroups.hashCode() : 0;
}

public static final class FieldGrantExcludeGroup {
    private final String[] grantedFields;
    private final String[] excludedFields;

    public FieldGrantExcludeGroup(String[] grantedFields, String[] excludedFields) {
        this.grantedFields = grantedFields;
        this.excludedFields = excludedFields;
    }

    public String[] getGrantedFields() {
        return grantedFields;
    }

    public String[] getExcludedFields() {
        return excludedFields;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;

        FieldGrantExcludeGroup that = (FieldGrantExcludeGroup) o;

        if (!Arrays.equals(grantedFields, that.grantedFields)) return false;
        return Arrays.equals(excludedFields, that.excludedFields);
    }

    @Override

```

```

    public int hashCode() {
        int result = Arrays.hashCode(GrantedFields);
        result = 31 * result + Arrays.hashCode(excludedFields);
        return result;
    }
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseAction extends Action<GetLicenseRequest, GetLicenseResponse,
GetLicenseRequestBuilder> {

    public static final GetLicenseAction INSTANCE = new GetLicenseAction();
    public static final String NAME = "cluster:monitor/xpack/license/get";

    private GetLicenseAction() {
        super(NAME);
    }

    @Override
    public GetLicenseResponse newResponse() {
        return new GetLicenseResponse();
    }

    @Override
    public GetLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetLicenseRequestBuilder(client, this);
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.AbstractNamedDiffable;
import org.elasticsearch.cluster.MergableCustomMetaData;
import org.elasticsearch.cluster.NamedDiff;

```

```

import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.io.IOException;
import java.util.EnumSet;

/**
 * Contains metadata about registered licenses
 */
public class LicensesMetaData extends AbstractNamedDiffable<MetaData.Custom> implements
XPackPlugin.XPackMetaDataCustom,
    MergableCustomMetaData<LicensesMetaData> {

    public static final String TYPE = "licenses";

    /**
     * When license is explicitly removed by a user, LICENSE_TOMBSTONE
     * is used as a placeholder in the license metadata. This enables
     * us to distinguish between the scenario when a cluster never
     * had a license (null) and when a license was removed explicitly
     * (LICENSE_TOMBSTONE).
     * We rely on this to decide whether to generate a unsigned trial
     * license or not. we should only generate a license if no license
     * ever existed in the cluster state
     */
    public static final License LICENSE_TOMBSTONE = License.builder()
        .type("trial")
        .issuer("elasticsearch")
        .uid("TOMBSTONE")
        .issuedTo("")
        .maxNodes(0)
        .issueDate(0)
        .expiryDate(0)
        .build();

    private License license;

    // This field describes the version of x-pack for which this cluster has exercised a trial. If the field
    // is null, then no trial has been exercised. We keep the version to leave open the possibility that we
    // may eventually allow a cluster to exercise a trial every time they upgrade to a new major version.
    @Nullable
    private Version trialVersion;

```

```

LicensesMetaData(License license, Version trialVersion) {
    this.license = license;
    this.trialVersion = trialVersion;
}

public License getLicense() {
    return license;
}

boolean isEligibleForTrial() {
    if (trialVersion == null) {
        return true;
    }
    return Version.CURRENT.major > trialVersion.major;
}

Version getMostRecentTrialVersion() {
    return trialVersion;
}

@Override
public String toString() {
    return "LicensesMetaData{" +
        "license=" + license +
        ", trialVersion=" + trialVersion +
        '}';
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    LicensesMetaData that = (LicensesMetaData) o;

    if (license != null ? !license.equals(that.license) : that.license != null) return false;
    return trialVersion != null ? trialVersion.equals(that.trialVersion) : that.trialVersion == null;
}

@Override
public int hashCode() {
    int result = license != null ? license.hashCode() : 0;
    result = 31 * result + (trialVersion != null ? trialVersion.hashCode() : 0);
    return result;
}

@Override

```

```

public String getWriteableName() {
    return TYPE;
}

@Override
public Version getMinimalSupportedVersion() {
    return Version.CURRENT.minimumCompatibilityVersion();
}

@Override
public EnumSet<MetaData.XContentContext> context() {
    return EnumSet.of(MetaData.XContentContext.GATEWAY);
}

public static LicensesMetaData fromXContent(XContentParser parser) throws IOException {
    License license = LICENSE_TOMBSTONE;
    Version trialLicense = null;
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String fieldName = parser.currentName();
            if (fieldName != null) {
                if (fieldName.equals(Fields.LICENSE)) {
                    token = parser.nextToken();
                    if (token == XContentParser.Token.START_OBJECT) {
                        license = License.fromXContent(parser);
                    } else if (token == XContentParser.Token.VALUE_NULL) {
                        license = LICENSE_TOMBSTONE;
                    }
                } else if (fieldName.equals(Fields.TRIAL_LICENSE)) {
                    parser.nextToken();
                    trialLicense = Version.fromString(parser.text());
                }
            }
        }
    }
    return new LicensesMetaData(license, trialLicense);
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        builder.nullField(Fields.LICENSE);
    } else {
        builder.startObject(Fields.LICENSE);
        license.toInnerXContent(builder, params);
        builder.endObject();
    }
}

```

```

    if (trialVersion != null) {
        builder.field(Fields.TRIAL_LICENSE, trialVersion.toString());
    }
    return builder;
}

@Override
public void writeTo(StreamOutput streamOutput) throws IOException {
    if (license == LICENSE_TOMBSTONE) {
        streamOutput.writeBoolean(false); // no license
    } else {
        streamOutput.writeBoolean(true); // has a license
        license.writeTo(streamOutput);
    }
    if (streamOutput.getVersion().onOrAfter(Version.V_6_1_0)) {
        if (trialVersion == null) {
            streamOutput.writeBoolean(false);
        } else {
            streamOutput.writeBoolean(true);
            Version.writeVersion(trialVersion, streamOutput);
        }
    }
}

public LicensesMetaData(StreamInput streamInput) throws IOException {
    if (streamInput.readBoolean()) {
        license = License.readLicense(streamInput);
    } else {
        license = LICENSE_TOMBSTONE;
    }
    if (streamInput.getVersion().onOrAfter(Version.V_6_1_0)) {
        boolean hasExercisedTrial = streamInput.readBoolean();
        if (hasExercisedTrial) {
            this.trialVersion = Version.readVersion(streamInput);
        }
    }
}

public static NamedDiff<MetaData.Custom> readDiffFrom(StreamInput streamInput) throws IOException {
    return readDiffFrom(MetaData.Custom.class, TYPE, streamInput);
}

public static License extractLicense(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        License license = licensesMetaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return null;
        } else {

```

```

        return license;
    }
}
return null;
}

@Override
public LicensesMetaData merge(LicensesMetaData other) {
    if (other.license == null) {
        return this;
    } else if (license == null
        || OperationMode.compare(other.license.operationMode(), license.operationMode()) > 0) {
        return other;
    }
    return this;
}

private static final class Fields {
    private static final String LICENSE = "license";
    private static final String TRIAL_LICENSE = "trial_license";
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestController.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
    public RestDeleteLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(DELETE, URI_BASE + "/license", this,
            DELETE, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0

```



```

        controller.registerAsDeprecatedHandler(DELETE, "/_licenses", this,
            "[DELETE /_licenses] is deprecated! Use " +
            "[DELETE /_xpack/license] instead.",
            deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_delete_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        DeleteLicenseRequest deleteLicenseRequest = new DeleteLicenseRequest();
        deleteLicenseRequest.timeout(request.paramAsTime("timeout", deleteLicenseRequest.timeout()));
        deleteLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
        deleteLicenseRequest.masterNodeTimeout()));

        return channel -> client.es().admin().cluster().execute(DeleteLicenseAction.INSTANCE, deleteLicenseRequest,
            new RestToXContentListener<>(channel));
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
PutLicenseRequestBuilder> {

    public static final PutLicenseAction INSTANCE = new PutLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/put";

    private PutLicenseAction() {
        super(NAME);
    }

    @Override
    public PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }
}

```

```

@Override
public PutLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new PutLicenseRequestBuilder(client, this);
}
}
/*
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetBasicStatusRequest extends MasterNodeReadRequest<GetBasicStatusRequest> {

    public GetBasicStatusRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetTrialStatusAction extends Action<GetTrialStatusRequest, GetTrialStatusResponse,
GetTrialStatusRequestBuilder> {

    public static final GetTrialStatusAction INSTANCE = new GetTrialStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/trial_status";

    private GetTrialStatusAction() {
        super(NAME);
    }
}

```

```

@Override
public GetTrialStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new GetTrialStatusRequestBuilder(client, this);
}

@Override
public GetTrialStatusResponse newResponse() {
    return new GetTrialStatusResponse();
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetBasicStatusAction extends TransportMasterNodeReadAction<GetBasicStatusRequest,
GetBasicStatusResponse> {

    @Inject
    public TransportGetBasicStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,

        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetBasicStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, GetBasicStatusRequest::new);
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override

```

```

protected GetBasicStatusResponse newResponse() {
    return new GetBasicStatusResponse();
}

@Override
protected void masterOperation(GetBasicStatusRequest request, ClusterState state,
    ActionListener<GetBasicStatusResponse> listener) throws Exception {
    LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
    if (licensesMetaData == null) {
        listener.onResponse(new GetBasicStatusResponse(true));
    } else {
        License license = licensesMetaData.getLicense();
        listener.onResponse(new GetBasicStatusResponse(license == null || license.type().equals("basic") == false));
    }
}

@Override
protected ClusterBlockException checkBlock(GetBasicStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartBasicAction extends TransportMasterNodeAction<PostStartBasicRequest,
    PostStartBasicResponse> {

    private final LicenseService licenseService;

    @Inject

```

```

public TransportPostStartBasicAction(Settings settings, TransportService transportService, ClusterService
clusterService,
        LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
    super(settings, PostStartBasicAction.NAME, transportService, clusterService, threadPool, actionFilters,
        indexNameExpressionResolver, PostStartBasicRequest::new);
    this.licenseService = licenseService;
}

@Override
protected String executor() {
    return ThreadPool.Names.SAME;
}

@Override
protected PostStartBasicResponse newResponse() {
    return new PostStartBasicResponse();
}

@Override
protected void masterOperation(PostStartBasicRequest request, ClusterState state,
        ActionListener<PostStartBasicResponse> listener) throws Exception {
    licenseService.startBasicLicense(request, listener);
}

@Override
protected ClusterBlockException checkBlock(PostStartBasicRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

```

```

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetTrialStatus extends XPackRestHandler {

    RestGetTrialStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/trial_status", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        return channel -> client.licensing().prepareGetStartTrial().execute(
            new RestBuilderListener<GetTrialStatusResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetTrialStatusResponse response, XContentBuilder builder) throws
                Exception {
                    builder.startObject();
                    builder.field("eligible_to_start_trial", response.isEligibleToStartTrial());
                    builder.endObject();
                    return new BytesRestResponse(RestStatus.OK, builder);
                }
            });
    }

    @Override
    public String getName() {
        return "xpack_trial_status_action";
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseAction extends Action<DeleteLicenseRequest, DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

    public static final DeleteLicenseAction INSTANCE = new DeleteLicenseAction();
    public static final String NAME = "cluster:admin/xpack/license/delete";
}

```

```

private DeleteLicenseAction() {
    super(NAME);
}

@Override
public DeleteLicenseResponse newResponse() {
    return new DeleteLicenseResponse();
}

@Override
public DeleteLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
    return new DeleteLicenseRequestBuilder(client, this);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetTrialStatusRequest extends MasterNodeReadRequest<GetTrialStatusRequest> {

    public GetTrialStatusRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}
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 */
package org.elasticsearch.license;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;

```

```

import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.core.internal.io.Streams;

import java.io.ByteArrayOutputStream;
import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Arrays;
import java.util.Base64;
import java.util.Collections;

/**
 * Responsible for verifying signed licenses
 */
public class LicenseVerifier {

    /**
     * verifies the license content with the signature using the packaged
     * public key
     * @param license to verify
     * @return true if valid, false otherwise
     */
    public static boolean verifyLicense(final License license, byte[] encryptedPublicKeyData) {
        byte[] signedContent = null;
        byte[] signatureHash = null;
        try {
            byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
            ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
            int version = byteBuffer.getInt();
            int magicLen = byteBuffer.getInt();
            byte[] magic = new byte[magicLen];
            byteBuffer.get(magic);
            int hashLen = byteBuffer.getInt();
            signatureHash = new byte[hashLen];
            byteBuffer.get(signatureHash);
            int signedContentLen = byteBuffer.getInt();
            signedContent = new byte[signedContentLen];
            byteBuffer.get(signedContent);
            XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
            license.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
            Signature rsa = Signature.getInstance("SHA512withRSA");

```



```

    rsa.initVerify(CryptUtils.readEncryptedPublicKey(encryptedPublicKeyData));
    BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
    BytesRef ref;
    while((ref = iterator.next()) != null) {
        rsa.update(ref.bytes, ref.offset, ref.length);
    }
    return rsa.verify(signedContent)
        && Arrays.equals(Base64.getEncoder().encode(encryptedPublicKeyData), signatureHash);
} catch (IOException | NoSuchAlgorithmException | SignatureException | InvalidKeyException e) {
    throw new IllegalStateException(e);
} finally {
    Arrays.fill(encryptedPublicKeyData, (byte) 0);
    if (signedContent != null) {
        Arrays.fill(signedContent, (byte) 0);
    }
    if (signatureHash != null) {
        Arrays.fill(signatureHash, (byte) 0);
    }
}
}
}

```

```

public static boolean verifyLicense(final License license) {
    final byte[] publicKeyBytes;
    try (InputStream is = LicenseVerifier.class.getResourceAsStream("/public.key")) {
        ByteArrayOutputStream out = new ByteArrayOutputStream();
        Streams.copy(is, out);
        publicKeyBytes = out.toByteArray();
    } catch (IOException ex) {
        throw new IllegalStateException(ex);
    }
    return verifyLicense(license, publicKeyBytes);
}
}

```

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*/

```
package org.elasticsearch.license;
```

```

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;

```

```

import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicReference;

public class StartBasicClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
To acknowledge the license, " +
        "please read the following messages and call /start_basic again, this time with the \"acknowledge=true\"
parameter:";

    private final Logger logger;
    private final String clusterName;
    private final PostStartBasicRequest request;
    private final ActionListener<PostStartBasicResponse> listener;
    private final Clock clock;
    private AtomicReference<Map<String, String[]>> ackMessages = new
AtomicReference<>(Collections.emptyMap());

    StartBasicClusterTask(Logger logger, String clusterName, Clock clock, PostStartBasicRequest request,
        ActionListener<PostStartBasicResponse> listener) {
        this.logger = logger;
        this.clusterName = clusterName;
        this.request = request;
        this.listener = listener;
        this.clock = clock;
    }

    @Override
    public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
        LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
        logger.debug("license prior to starting basic license: {}", oldLicensesMetaData);
        License oldLicense = LicensesMetaData.extractLicense(oldLicensesMetaData);
        Map<String, String[]> acknowledgeMessages = ackMessages.get();
        if (acknowledgeMessages.isEmpty() == false) {
            listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT, acknowledgeMessages,
                ACKNOWLEDGEMENT_HEADER));
        } else if (oldLicense != null && oldLicense.type().equals("basic")) {
            listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.ALREADY_USING_BASIC));
        } else {
            listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.GENERATED_BASIC));
        }
    }
}

```

```

}

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
    LicensesMetaData licensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
    License currentLicense = LicensesMetaData.extractLicense(licensesMetaData);
    if (currentLicense == null || currentLicense.type().equals("basic") == false) {
        long issueDate = clock.millis();
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type("basic")
            .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        if (request.isAcknowledged() == false && currentLicense != null) {
            Map<String, String[]> ackMessages = LicenseService.getAckMessages(selfGeneratedLicense,
currentLicense);
            if (ackMessages.isEmpty() == false) {
                this.ackMessages.set(ackMessages);
                return currentState;
            }
        }
        Version trialVersion = null;
        if (licensesMetaData != null) {
            trialVersion = licensesMetaData.getMostRecentTrialVersion();
        }
        LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense, trialVersion);
        mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}
}

```

```

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
    listener.onFailure(e);
}
}

```

```

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```

```

*/
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.logging.LogMessageFormat;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.monitoring.MonitoringField;

import java.util.Collections;
import java.util.LinkedHashMap;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.concurrent.CopyOnWriteArrayList;
import java.util.function.BiFunction;

/**
 * A holder for the current state of the license for all xpack features.
 */
public class XPackLicenseState {

    /** Messages for each feature which are printed when the license expires. */
    static final Map<String, String[]> EXPIRATION_MESSAGES;
    static {
        Map<String, String[]> messages = new LinkedHashMap<>();
        messages.put(XPackField.SECURITY, new String[] {
            "Cluster health, cluster stats and indices stats operations are blocked",
            "All data operations (read and write) continue to work"
        });
        messages.put(XPackField.WATCHER, new String[] {
            "PUT / GET watch APIs are disabled, DELETE watch API continues to work",
            "Watches execute and write to the history",
            "The actions of the watches don't execute"
        });
        messages.put(XPackField.MONITORING, new String[] {
            "The agent will stop collecting cluster and indices metrics",
            "The agent will stop automatically cleaning indices older than [xpack.monitoring.history.duration]"
        });
        messages.put(XPackField.GRAPH, new String[] {
            "Graph explore APIs are disabled"
        });
        messages.put(XPackField.MACHINE_LEARNING, new String[] {

```

```

        "Machine learning APIs are disabled"
    });
    messages.put(XPackField.LOGSTASH, new String[] {
        "Logstash will continue to poll centrally-managed pipelines"
    });
    messages.put(XPackField.DEPRECATATION, new String[] {
        "Deprecation APIs are disabled"
    });
    messages.put(XPackField.UPGRADE, new String[] {
        "Upgrade API is disabled"
    });
    messages.put(XPackField.SQL, new String[] {
        "SQL support is disabled"
    });
    messages.put(XPackField.ROLLUP, new String[] {
        "Creating and Starting rollup jobs will no longer be allowed.",
        "Stopping/Deleting existing jobs, RollupCaps API and RollupSearch continue to function."
    });
    EXPIRATION_MESSAGES = Collections.unmodifiableMap(messages);
}

/**
 * Messages for each feature which are printed when the license type changes.
 * The value is a function taking the old and new license type, and returns the messages for that feature.
 */
static final Map<String, BiFunction<OperationMode, OperationMode, String[]>>
ACKNOWLEDGMENT_MESSAGES;
static {
    Map<String, BiFunction<OperationMode, OperationMode, String[]>> messages = new LinkedHashMap<>();
    messages.put(XPackField.SECURITY, XPackLicenseState::securityAcknowledgementMessages);
    messages.put(XPackField.WATCHER, XPackLicenseState::watcherAcknowledgementMessages);
    messages.put(XPackField.MONITORING, XPackLicenseState::monitoringAcknowledgementMessages);
    messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
    messages.put(XPackField.MACHINE_LEARNING,
XPackLicenseState::machineLearningAcknowledgementMessages);
    messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgementMessages);
    messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
    ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}

private static String[] securityAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:

```

```

    case PLATINUM:
        return new String[] {
            "The following X-Pack security functionality will be disabled: authentication, authorization, " +
            "ip filtering, and auditing. Please restart your node after applying the license.",
            "Field and document level access control will be disabled.",
            "Custom realms will be ignored."
        };
    }
    break;
case GOLD:
    switch (currentMode) {
        case BASIC:
        case STANDARD:
            // ^^ though technically it was already disabled, it's not bad to remind them
        case TRIAL:
        case PLATINUM:
            return new String[] {
                "Field and document level access control will be disabled.",
                "Custom realms will be ignored."
            };
        }
    break;
case STANDARD:
    switch (currentMode) {
        case BASIC:
            // ^^ though technically it was already disabled, it's not bad to remind them
        case GOLD:
        case PLATINUM:
        case TRIAL:
            return new String[] {
                "Authentication will be limited to the native realms.",
                "IP filtering and auditing will be disabled.",
                "Field and document level access control will be disabled.",
                "Custom realms will be ignored."
            };
        }
    }
return Strings.EMPTY_ARRAY;
}

```

```

private static String[] watcherAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:

```

```

        case PLATINUM:
            return new String[] { "Watcher will be disabled" };
        }
        break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] monitoringAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] {
                        LoggerMessageFormat.format(
                            "Multi-cluster support is disabled for clusters with [{}] license. If you are\n" +
                                "running multiple clusters, users won't be able to access the clusters with\n" +
                                "[{}] licenses from within a single X-Pack Kibana instance. You will have to deploy a\n" +
                                "separate and dedicated X-pack Kibana instance for each [{}] cluster you wish to monitor.",
                            newMode, newMode, newMode),
                        LoggerMessageFormat.format(
                            "Automatic index cleanup is locked to {} days for clusters with [{}] license.",
                            MonitoringField.HISTORY_DURATION.getDefault(Settings.EMPTY).days(), newMode)
                    };
                }
            break;
        }
        return Strings.EMPTY_ARRAY;
    }
}

private static String[] graphAcknowledgementMessages(OperationMode currentMode, OperationMode newMode)
{
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Graph will be disabled" };
                }
            break;
        }
        return Strings.EMPTY_ARRAY;
    }
}

```

```

}

private static String[] machineLearningAcknowledgementMessages(OperationMode currentMode,
OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "Machine learning will be disabled" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] logstashAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
    switch (newMode) {
        case BASIC:
            switch (currentMode) {
                case TRIAL:
                case STANDARD:
                case GOLD:
                case PLATINUM:
                    return new String[] { "Logstash will no longer poll for centrally-managed pipelines" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

private static String[] sqlAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
    switch (newMode) {
        case BASIC:
        case STANDARD:
        case GOLD:
            switch (currentMode) {
                case TRIAL:
                case PLATINUM:
                    return new String[] { "JDBC support will be disabled, but you can continue to use SQL CLI and
REST endpoint" };
            }
            break;
    }
    return Strings.EMPTY_ARRAY;
}

```



```

}

/** A wrapper for the license mode and state, to allow atomically swapping. */
private static class Status {

    /** The current "mode" of the license (ie license type). */
    final OperationMode mode;

    /** True if the license is active, or false if it is expired. */
    final boolean active;

    Status(OperationMode mode, boolean active) {
        this.mode = mode;
        this.active = active;
    }
}

private volatile Status status = new Status(OperationMode.TRIAL, true);
private final List<Runnable> listeners = new CopyOnWriteArrayList<>();
private final boolean isSecurityEnabled;
private final boolean isSecurityExplicitlyEnabled;
private volatile boolean isSecurityEnabledByTrialVersion;

public XPackLicenseState(Settings settings) {
    this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
    // 6.0+ requires TLS for production licenses, so if TLS is enabled and security is enabled
    // we can interpret this as an explicit enabling of security if the security enabled
    // setting is not explicitly set
    this.isSecurityExplicitlyEnabled = isSecurityEnabled &&
        (settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) ||
XPackSettings.TRANSPORT_SSL_ENABLED.get(settings));
    this.isSecurityEnabledByTrialVersion = false;
}

/**
 * Updates the current state of the license, which will change what features are available.
 *
 * @param mode The mode (type) of the current license.
 * @param active True if the current license exists and is within its allowed usage period; false if it is expired or
missing.
 * @param mostRecentTrialVersion If this cluster has, at some point commenced a trial, the most recent version
on which they did that.
 *
 * May be { @code null } if they have never generated a trial license on this cluster, or the most
recent
 *
 * trial was prior to this metadata being tracked (6.1)
 */
void update(OperationMode mode, boolean active, @Nullable Version mostRecentTrialVersion) {
    status = new Status(mode, active);
}

```

```

if (isSecurityEnabled == true && isSecurityExplicitlyEnabled == false && mode == OperationMode.TRIAL
    && isSecurityEnabledByTrialVersion == false) {
    // Before 6.3, Trial licenses would default having security enabled.
    // If this license was generated before that version, then treat it as if security is explicitly enabled
    if (mostRecentTrialVersion == null || mostRecentTrialVersion.before(Version.V_6_3_0)) {
        Loggers.getLogger(getClass()).info("Automatically enabling security for older trial license ({})",
            mostRecentTrialVersion == null ? "[pre 6.1.0]" : mostRecentTrialVersion.toString());
        isSecurityEnabledByTrialVersion = true;
    }
}
listeners.forEach(Runnable::run);
}

/** Add a listener to be notified on license change */
public void addListener(Runnable runnable) {
    listeners.add(Objects.requireNonNull(runnable));
}

/** Remove a listener */
public void removeListener(Runnable runnable) {
    listeners.remove(runnable);
}

/** Return the current license type. */
public OperationMode getOperationMode() {
    return status.mode;
}

/** Return true if the license is currently within its time boundaries, false otherwise. */
public boolean isActive() {
    return status.active;
}

/**
 * @return true if authentication and authorization should be enabled. this does not indicate what realms are
 * available
 * @see #allowedRealmType() for the enabled realms
 */
public boolean isAuthAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.STANDARD || mode == OperationMode.GOLD || mode ==
OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * @return true if IP filtering should be enabled
 */

```

```

public boolean isIpFilteringAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * @return true if auditing should be enabled
 */
public boolean isAuditingAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
        || mode == OperationMode.TRIAL;
}

/**
 * Indicates whether the stats and health API calls should be allowed. If a license is expired and past the grace
 * period then we deny these calls.
 *
 * @return true if the license allows for the stats and health APIs to be used.
 */
public boolean isStatsAndHealthAllowed() {
    return status.active;
}

/**
 * Determine if Document Level Security (DLS) and Field Level Security (FLS) should be enabled.
 * <p>
 * DLS and FLS are only disabled when the mode is not:
 * <ul>
 * <li>{@link OperationMode#PLATINUM}</li>
 * <li>{@link OperationMode#TRIAL}</li>
 * </ul>
 * Note: This does not consider the <em>state</em> of the license so that Security does not suddenly leak
information!
 *
 * @return {@code true} to enable DLS and FLS. Otherwise {@code false}.
 */
public boolean isDocumentAndFieldLevelSecurityAllowed() {
    OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL || mode == OperationMode.PLATINUM;
}

/** Classes of realms that may be available based on the license type. */
public enum AllowedRealmType {
    NONE,
    NATIVE,
    DEFAULT,
}

```

```

    ALL
}

/**
 * @return the type of realms that are enabled based on the license { @link OperationMode }
 */
public AllowedRealmType allowedRealmType() {
    switch (status.mode) {
        case PLATINUM:
        case TRIAL:
            return AllowedRealmType.ALL;
        case GOLD:
            return AllowedRealmType.DEFAULT;
        case STANDARD:
            return AllowedRealmType.NATIVE;
        default:
            return AllowedRealmType.NONE;
    }
}

/**
 * @return whether custom role providers are allowed based on the license { @link OperationMode }
 */
public boolean isCustomRoleProvidersAllowed() {
    final Status localStatus = status;
    return (localStatus.mode == OperationMode.PLATINUM || localStatus.mode == OperationMode.TRIAL )
        && localStatus.active;
}

/**
 * Determine if Watcher is available based on the current license.
 * <p>
 * Watcher is available if the license is active (hasn't expired) and of one of the following types:
 * <ul>
 * <li>{ @link OperationMode#STANDARD}</li>
 * <li>{ @link OperationMode#PLATINUM}</li>
 * <li>{ @link OperationMode#GOLD}</li>
 * <li>{ @link OperationMode#TRIAL}</li>
 * </ul>
 *
 * @return { @code true } as long as the license is valid. Otherwise { @code false }.
 */
public boolean isWatcherAllowed() {
    // status is volatile, so a local variable is used for a consistent view
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }
}

```

```

    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:
        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

/**
 * Monitoring is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isMonitoringAllowed() {
    return status.active;
}

/**
 * Monitoring Cluster Alerts requires the equivalent license to use Watcher.
 *
 * @return {@link #isWatcherAllowed()}
 * @see #isWatcherAllowed()
 */
public boolean isMonitoringClusterAlertsAllowed() {
    return isWatcherAllowed();
}

/**
 * Determine if the current license allows the retention of indices to be modified.
 * <p>
 * Only users with a non-{@link OperationMode#BASIC} license can update the retention period.
 * <p>
 * Note: This does not consider the <em>state</em> of the license so that any change is remembered for when
they fix their license.
 *
 * @return {@code true} if the user is allowed to modify the retention. Otherwise {@code false}.
 */
public boolean isUpdateRetentionAllowed() {
    final OperationMode mode = status.mode;
    return mode != OperationMode.BASIC && mode != OperationMode.MISSING;
}

/**

```

```

* Determine if Graph Exploration should be enabled.
* <p>
* Exploration is only disabled when the license has expired or if the mode is not:
* <ul>
* <li>{ @link OperationMode#PLATINUM}</li>
* <li>{ @link OperationMode#TRIAL}</li>
* </ul>
*
* @return { @code true } as long as the license is valid. Otherwise { @code false }.
*/
public boolean isGraphAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
* Determine if Machine Learning should be enabled.
* <p>
* Machine Learning is only disabled when the license has expired or if the
* mode is not:
* <ul>
* <li>{ @link OperationMode#PLATINUM}</li>
* <li>{ @link OperationMode#TRIAL}</li>
* </ul>
*
* @return { @code true } as long as the license is valid. Otherwise
*     { @code false }.
*/
public boolean isMachineLearningAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

/**
* Rollup is always available as long as there is a valid license
*

```

```

* @return true if the license is active
*/
public boolean isRollupAllowed() {
    return status.active;
}

/**
* Logstash is allowed as long as there is an active license of type TRIAL, STANDARD, GOLD or PLATINUM
* @return {@code true} as long as there is a valid license
*/
public boolean isLogstashAllowed() {
    Status localStatus = status;

    if (localStatus.active == false) {
        return false;
    }

    switch (localStatus.mode) {
        case TRIAL:
        case GOLD:
        case PLATINUM:
        case STANDARD:
            return true;
        default:
            return false;
    }
}

/**
* Deprecation APIs are always allowed as long as there is an active license
* @return {@code true} as long as there is a valid license
*/
public boolean isDeprecationAllowed() {
    return status.active;
}

/**
* Determine if Upgrade API should be enabled.
* <p>
* Upgrade API is not available in for all license types except {@link OperationMode#MISSING}
*
* @return {@code true} as long as the license is valid. Otherwise
*         {@code false}.
*/
public boolean isUpgradeAllowed() {
    // status is volatile
    Status localStatus = status;
    // Should work on all active licenses

```

```

    return localStatus.active;
}

/**
 * Determine if SQL support should be enabled.
 * <p>
 * SQL is available for all license types except { @link OperationMode#MISSING }
 */
public boolean isSqlAllowed() {
    return status.active;
}

/**
 * Determine if JDBC support should be enabled.
 * <p>
 * JDBC is available only in for { @link OperationMode#PLATINUM } and { @link OperationMode#TRIAL }
licences
 */
public boolean isJdbcAllowed() {
    // status is volatile
    Status localStatus = status;
    OperationMode operationMode = localStatus.mode;

    boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

    return licensed && localStatus.active;
}

public boolean isTrialLicense() {
    return status.mode == OperationMode.TRIAL;
}

public boolean isSecurityAvailable() {
    OperationMode mode = status.mode;
    return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM || mode ==
OperationMode.STANDARD ||
        mode == OperationMode.TRIAL;
}

public boolean isSecurityEnabled() {
    final OperationMode mode = status.mode;
    return mode == OperationMode.TRIAL ? (isSecurityExplicitlyEnabled || isSecurityEnabledByTrialVersion) :
isSecurityEnabled;
}
}
}
/**
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```



```

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*/
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseResponse extends AcknowledgedResponse {

    DeleteLicenseResponse() {
    }

    DeleteLicenseResponse(boolean acknowledged) {
        super(acknowledged);
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        readAcknowledged(in);
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        writeAcknowledged(out);
    }

}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;

import java.io.IOException;
import java.util.Collections;

```

```

import java.util.HashMap;
import java.util.Map;

public class PutLicenseResponse extends AcknowledgedResponse {

    private LicensesStatus status;
    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeHeader;

    PutLicenseResponse() {
    }

    public PutLicenseResponse(boolean acknowledged, LicensesStatus status) {
        this(acknowledged, status, null, Collections.<String, String[]>emptyMap());
    }

    public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String acknowledgeHeader,
        Map<String, String[]> acknowledgeMessages) {
        super(acknowledged);
        this.status = status;
        this.acknowledgeHeader = acknowledgeHeader;
        this.acknowledgeMessages = acknowledgeMessages;
    }

    public LicensesStatus status() {
        return status;
    }

    public Map<String, String[]> acknowledgeMessages() {
        return acknowledgeMessages;
    }

    public String acknowledgeHeader() {
        return acknowledgeHeader;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        readAcknowledged(in);
        status = LicensesStatus.fromId(in.readVInt());
        acknowledgeHeader = in.readOptionalString();
        int size = in.readVInt();
        Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
        for (int i = 0; i < size; i++) {
            String feature = in.readString();
            int nMessages = in.readVInt();
            String[] messages = new String[nMessages];

```

```

    for (int j = 0; j < nMessages; j++) {
        messages[j] = in.readString();
    }
    acknowledgeMessages.put(feature, messages);
}
this.acknowledgeMessages = acknowledgeMessages;
}

```

@Override

```

public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
    out.writeVInt(status.id());
    out.writeOptionalString(acknowledgeHeader);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}
}

```

@Override

```

protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    switch (status) {
        case VALID:
            builder.field("license_status", "valid");
            break;
        case INVALID:
            builder.field("license_status", "invalid");
            break;
        case EXPIRED:
            builder.field("license_status", "expired");
            break;
        default:
            throw new IllegalArgumentException("unknown status [" + status + "] found");
    }
    if (!acknowledgeMessages.isEmpty()) {
        builder.startObject("acknowledge");
        builder.field("message", acknowledgeHeader);
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            builder.startArray(entry.getKey());
            for (String message : entry.getValue()) {
                builder.value(message);
            }
        }
        builder.endArray();
    }
}

```

```

    }
    builder.endObject();
}
}

@Override
public String toString() {
    return Strings.toString(this, true, true);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
    PostStartTrialResponse, PostStartTrialRequestBuilder> {

    PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
        super(client, action, new PostStartTrialRequest());
    }

    public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;

```

```

import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportDeleteLicenseAction extends TransportMasterNodeAction<DeleteLicenseRequest,
DeleteLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportDeleteLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, DeleteLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
              indexNameExpressionResolver, DeleteLicenseRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected DeleteLicenseResponse newResponse() {
        return new DeleteLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(DeleteLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }

    @Override
    protected void masterOperation(final DeleteLicenseRequest request, ClusterState state, final
ActionListener<DeleteLicenseResponse>
        listener) throws ElasticsearchException {
        licenseService.removeLicense(request, new ActionListener<ClusterStateUpdateResponse>() {
            @Override
            public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
                listener.onResponse(new DeleteLicenseResponse(clusterStateUpdateResponse.isAcknowledged()));
            }
        });
    }

    @Override
    public void onFailure(Exception e) {

```

```

        listener.onFailure(e);
    }
    });
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.apache.lucene.util.BytesRef;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.watcher.FileChangesListener;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.concurrent.atomic.AtomicBoolean;

/**
 * File based watcher for license { @link OperationMode }
 * Watches for changes in <code>licenseModePath</code>, use
 * { @link #getCurrentOperationMode() } to access the latest mode
 *
 * In case of failure to read a valid operation mode from <code>licenseModePath</code>,
 * the operation mode will default to PLATINUM
 */
public final class OperationModeFileWatcher implements FileChangesListener {
    private final ResourceWatcherService resourceWatcherService;
    private final Path licenseModePath;
    private final AtomicBoolean initialized = new AtomicBoolean();
    private final OperationMode defaultOperationMode = OperationMode.PLATINUM;
    private volatile OperationMode currentOperationMode = defaultOperationMode;
    private final Logger logger;
    private final Runnable onChange;

    public OperationModeFileWatcher(ResourceWatcherService resourceWatcherService, Path licenseModePath,
        Logger logger, Runnable onChange) {

```

```

    this.resourceWatcherService = resourceWatcherService;
    this.licenseModePath = licenseModePath;
    this.logger = logger;
    this.onChange = onChange;
}

public void init() {
    if (initialized.compareAndSet(false, true)) {
        final FileWatcher watcher = new FileWatcher(licenseModePath);
        watcher.addListener(this);
        try {
            resourceWatcherService.add(watcher, ResourceWatcherService.Frequency.HIGH);
            if (Files.exists(licenseModePath)) {
                onChange(licenseModePath);
            }
        } catch (IOException e) {
            logger.error("couldn't initialize watching license mode file", e);
        }
    }
}

/**
 * Returns the current operation mode based on license mode file.
 * Defaults to {@link OperationMode#PLATINUM}
 */
public OperationMode getCurrentOperationMode() {
    return currentOperationMode;
}

@Override
public void onFileInit(Path file) {
    onChange(file);
}

@Override
public void onFileCreated(Path file) {
    onChange(file);
}

@Override
public void onFileDeleted(Path file) {
    onChange(file);
}

@Override
public void onFileChanged(Path file) {
    onChange(file);
}

```

```

private synchronized void onChange(Path file) {
    if (file.equals(licenseModePath)) {
        OperationMode newOperationMode = defaultOperationMode;
        try {
            if (Files.exists(licenseModePath)
                && Files.isReadable(licenseModePath)) {
                final byte[] content;
                try {
                    content = Files.readAllBytes(licenseModePath);
                } catch (IOException e) {
                    logger.error(
                        (Supplier<?>) () -> new ParameterizedMessage(
                            "couldn't read operation mode from [{}]", licenseModePath.toAbsolutePath()), e);
                    return;
                }
                // this UTF-8 conversion is much pickier than java String
                final String operationMode = new BytesRef(content).utf8ToString();
                try {
                    newOperationMode = OperationMode.resolve(operationMode);
                } catch (IllegalArgumentException e) {
                    logger.error(
                        (Supplier<?>) () -> new ParameterizedMessage(
                            "invalid operation mode in [{}]", licenseModePath.toAbsolutePath()), e);
                    return;
                }
            }
        } finally {
            // set this after the fact to prevent that we are jumping back and forth first setting to defaultl and then
            // actual op mode resetting it.
            this.currentOperationMode = newOperationMode;
        }
        onChange.run();
    }
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetTrialStatusRequestBuilder extends ActionRequestBuilder<GetTrialStatusRequest,

```



```

    GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

    GetTrialStatusRequestBuilder(ElasticsearchClient client, GetTrialStatusAction action) {
        super(client, action, new GetTrialStatusRequest());
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.ValidateActions;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;

public class PutLicenseRequest extends AcknowledgedRequest<PutLicenseRequest> {

    private License license;
    private boolean acknowledge = false;

    public PutLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return (license == null) ? ValidateActions.addValidationError("license is missing", null) : null;
    }

    /**
     * Parses license from json format to an instance of { @link License }
     *
     * @param licenseDefinition licenses definition
     * @param xContentType the content type of the license
     */
    public PutLicenseRequest license(BytesReference licenseDefinition, XContentType xContentType) {
        try {
            return license(License.fromSource(licenseDefinition, xContentType));
        } catch (IOException e) {
            throw new IllegalArgumentException("failed to parse license source", e);
        }
    }
}

```

```

    }
}

public PutLicenseRequest license(License license) {
    this.license = license;
    return this;
}

public License license() {
    return license;
}

public PutLicenseRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean acknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    license = License.readLicense(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    license.writeTo(out);
    out.writeBoolean(acknowledge);
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;

```

```

import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;

import static org.elasticsearch.license.CryptUtils.decrypt;
import static org.elasticsearch.license.CryptUtils.encrypt;

class SelfGeneratedLicense {

    public static License create(License.Builder specBuilder) {
        License spec = specBuilder
            .issuer("elasticsearch")
            .version(License.VERSION_CURRENT)
            .build();
        final String signature;
        try {
            XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
            spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
            byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
            byte[] bytes = new byte[4 + 4 + encrypt.length];
            ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
            // always generate license version -VERSION_CURRENT
            byteBuffer.putInt(-License.VERSION_CURRENT)
                .putInt(encrypt.length)
                .put(encrypt);
            signature = Base64.getEncoder().encodeToString(bytes);
        } catch (IOException e) {
            throw new IllegalStateException(e);
        }
        return License.builder().fromLicenseSpec(spec, signature).build();
    }

    public static boolean verify(final License license) {
        try {
            byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
            ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
            int version = byteBuffer.getInt();
            int contentLen = byteBuffer.getInt();
            byte[] content = new byte[contentLen];
            byteBuffer.get(content);
            final License expectedLicense;
            // EMPTY is safe here because we don't call namedObject
            try (XContentParser parser = XContentFactory.xContent(XContentType.JSON)

```

```

        .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE,
decrypt(content))) {
    parser.nextToken();
    expectedLicense = License.builder().fromLicenseSpec(License.fromXContent(parser),
        license.signature().version(-version).build());
    }
    return license.equals(expectedLicense);
} catch (IOException e) {
    throw new IllegalStateException(e);
}
}

public static boolean validSelfGeneratedType(String type) {
    return "basic".equals(type) || "trial".equals(type);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartTrialLicense extends XPackRestHandler {

    RestPostStartTrialLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_trial", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {

```

```

PostStartTrialRequest startTrialRequest = new PostStartTrialRequest();
startTrialRequest.setType(request.param("type", "trial"));
startTrialRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
return channel -> client.licensing().postStartTrial(startTrialRequest,
    new RestBuilderListener<PostStartTrialResponse>(channel) {
        @Override
        public RestResponse buildResponse(PostStartTrialResponse response, XContentBuilder builder) throws
Exception {
            PostStartTrialResponse.Status status = response.getStatus();
            builder.startObject();
            builder.field("acknowledged", startTrialRequest.isAcknowledged());
            if (status.isTrialStarted()) {
                builder.field("trial_was_started", true);
                builder.field("type", startTrialRequest.getType());
            } else {
                builder.field("trial_was_started", false);
                builder.field("error_message", status.getErrorMessage());
            }

            Map<String, String[]> acknowledgementMessages = response.getAcknowledgementMessages();
            if (acknowledgementMessages.isEmpty() == false) {
                builder.startObject("acknowledge");
                builder.field("message", response.getAcknowledgementMessage());
                for (Map.Entry<String, String[]> entry : acknowledgementMessages.entrySet()) {
                    builder.startArray(entry.getKey());
                    for (String message : entry.getValue()) {
                        builder.value(message);
                    }
                    builder.endArray();
                }
                builder.endObject();
            }
            builder.endObject();
            return new BytesRestResponse(status.getRestStatus(), builder);
        }
    });
}

@Override
public String getName() {
    return "xpack_upgrade_to_trial_action";
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */

```

```

package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetLicenseAction extends TransportMasterNodeReadAction<GetLicenseRequest,
GetLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportGetLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                   LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                   IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
              GetLicenseRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected GetLicenseResponse newResponse() {
        return new GetLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(GetLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
    }

    @Override

```

```

protected void masterOperation(final GetLicenseRequest request, ClusterState state,
                               final ActionListener<GetLicenseResponse> listener) throws ElasticsearchException {
    listener.onResponse(new GetLicenseResponse(licenseService.getLicense()));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartBasicLicense extends XPackRestHandler {

    RestPostStartBasicLicense(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(POST, URI_BASE + "/license/start_basic", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        PostStartBasicRequest startBasicRequest = new PostStartBasicRequest();
        startBasicRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        startBasicRequest.timeout(request.paramAsTime("timeout", startBasicRequest.timeout()));
        startBasicRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
startBasicRequest.masterNodeTimeout()));
        return channel -> client.licensing().postStartBasic(startBasicRequest, new
RestBuilderListener<PostStartBasicResponse>(channel) {
            @Override
            public RestResponse buildResponse(PostStartBasicResponse response, XContentBuilder builder) throws
Exception {
                PostStartBasicResponse.Status status = response.getStatus();

```

```

        response.toXContent(builder, ToXContent.EMPTY_PARAMS);
        return new BytesRestResponse(status.getRestStatus(), builder);
    }
});
}

@Override
public String getName() {
    return "xpack_start_basic_action";
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.util.ArrayList;
import java.util.Base64;
import java.util.Comparator;
import java.util.List;
import java.util.Locale;

import org.apache.lucene.util.CollectionUtil;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Data structure for license. Use {@link Builder} to build a license.
 * Provides serialization/deserialization & validation methods for license object
 */
public class License implements ToXContentObject {

```



```

public static final int VERSION_START = 1;
public static final int VERSION_NO_FEATURE_TYPE = 2;
public static final int VERSION_START_DATE = 3;
public static final int VERSION_CURRENT = VERSION_START_DATE;

/**
 * XContent param name to deserialize license(s) with
 * an additional <code>status</code> field, indicating whether a
 * particular license is 'active' or 'expired' and no signature
 * and in a human readable format
 */
public static final String REST_VIEW_MODE = "rest_view";
/**
 * XContent param name to deserialize license(s) with
 * no signature
 */
public static final String LICENSE_SPEC_VIEW_MODE = "license_spec_view";
/**
 * XContent param name to deserialize licenses according
 * to a specific license version
 */
public static final String LICENSE_VERSION_MODE = "license_version";

public static final Comparator<License> LATEST_ISSUE_DATE_FIRST =
Comparator.comparing(License::issueDate).reversed();

private final int version;
private final String uid;
private final String issuer;
private final String issuedTo;
private final long issueDate;
private final String type;
private final String subscriptionType;
private final String feature;
private final String signature;
private final long expiryDate;
private final long startDate;
private final int maxNodes;
private final OperationMode operationMode;

/**
 * Decouples operation mode of a license from the license type value.
 * <p>
 * Note: The mode indicates features that should be made available, but it does not indicate whether the license is
 active!
 *
 * The id byte is used for ordering operation modes (used for merging license md in tribe node)
 */

```

```

public enum OperationMode {
    MISSING((byte) 0),
    TRIAL((byte) 1),
    BASIC((byte) 2),
    STANDARD((byte) 3),
    GOLD((byte) 4),
    PLATINUM((byte) 5);

    private final byte id;

    OperationMode(byte id) {
        this.id = id;
    }

    /** Returns non-zero positive number when <code>opMode1</code> is greater than <code>opMode2</code>
    */
    public static int compare(OperationMode opMode1, OperationMode opMode2) {
        return Integer.compare(opMode1.id, opMode2.id);
    }

    public static OperationMode resolve(String type) {
        switch (type.toLowerCase(Locale.ROOT)) {
            case "missing":
                return MISSING;
            case "trial":
            case "none": // bwc for 1.x subscription_type field
            case "dev": // bwc for 1.x subscription_type field
            case "development": // bwc for 1.x subscription_type field
                return TRIAL;
            case "basic":
                return BASIC;
            case "standard":
                return STANDARD;
            case "silver":
            case "gold":
                return GOLD;
            case "platinum":
            case "cloud_internal":
            case "internal": // bwc for 1.x subscription_type field
                return PLATINUM;
            default:
                throw new IllegalArgumentException("unknown type [" + type + "]");
        }
    }
}

private License(int version, String uid, String issuer, String issuedTo, long issueDate, String type,
                String subscriptionType, String feature, String signature, long expiryDate, int maxNodes, long startDate)

```

```

{
    this.version = version;
    this.uid = uid;
    this.issuer = issuer;
    this.issuedTo = issuedTo;
    this.issueDate = issueDate;
    this.type = type;
    this.subscriptionType = subscriptionType;
    this.feature = feature;
    this.signature = signature;
    // We will validate that only a basic license can have the
BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
    // in the validate() method.
    if (expiryDate == -1) {
        this.expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
    } else {
        this.expiryDate = expiryDate;
    }
    this.maxNodes = maxNodes;
    this.startDate = startDate;
    if (version == VERSION_START) {
        // in 1.x: the acceptable values for 'subscription_type': none | dev | silver | gold | platinum
        this.operationMode = OperationMode.resolve(subscriptionType);
    } else {
        // in 2.x: the acceptable values for 'type': trial | basic | silver | dev | gold | platinum
        this.operationMode = OperationMode.resolve(type);
    }
    validate();
}

/**
 * @return version of the license
 */
public int version() {
    return version;
}

/**
 * @return a unique identifier for a license
 */
public String uid() {
    return uid;
}

/**
 * @return type of the license [trial, subscription, internal]
 */
public String type() {

```

```

    return type;
}

/**
 * @return the issueDate in milliseconds
 */
public long issueDate() {
    return issueDate;
}

/**
 * @return the startDate in milliseconds
 */
public long startDate() {
    return startDate;
}

/**
 * @return the expiry date in milliseconds
 */
public long expiryDate() {
    return expiryDate;
}

/**
 * @return the maximum number of nodes this license has been issued for
 */
public int maxNodes() {
    return maxNodes;
}

/**
 * @return a string representing the entity this licenses has been issued to
 */
public String issuedTo() {
    return issuedTo;
}

/**
 * @return a string representing the entity responsible for issuing this license (internal)
 */
public String issuer() {
    return issuer;
}

/**
 * @return a string representing the signature of the license used for license verification
 */

```

```

public String signature() {
    return signature;
}

/**
 * @return the operation mode of the license as computed from the license type or from
 * the license mode file
 */
public OperationMode operationMode() {
    synchronized (this) {
        if (canReadOperationModeFromFile() && operationModeFileWatcher != null) {
            return operationModeFileWatcher.getCurrentOperationMode();
        }
    }
    return operationMode;
}

private boolean canReadOperationModeFromFile() {
    return type.equals("cloud_internal");
}

private volatile OperationModeFileWatcher operationModeFileWatcher;

/**
 * Sets the operation mode file watcher for the license and initializes the
 * file watcher when the license type allows to override operation mode from file
 */
public synchronized void setOperationModeFileWatcher(final OperationModeFileWatcher
operationModeFileWatcher) {
    this.operationModeFileWatcher = operationModeFileWatcher;
    if (canReadOperationModeFromFile()) {
        this.operationModeFileWatcher.init();
    }
}

/**
 * Removes operation mode file watcher, so unused license objects can be gc'ed
 */
public synchronized void removeOperationModeFileWatcher() {
    this.operationModeFileWatcher = null;
}

/**
 * @return the current license's status
 */
public Status status() {
    long now = System.currentTimeMillis();
    if (issueDate > now) {

```

```

        return Status.INVALID;
    } else if (expiryDate < now) {
        return Status.EXPIRED;
    }
    return Status.ACTIVE;
}

private void validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (subscriptionType == null && version == VERSION_START) {
        throw new IllegalStateException("subscriptionType can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (feature == null && version == VERSION_START) {
        throw new IllegalStateException("feature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    } else if (expiryDate == LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
&& "basic".equals(type) == false) {
        throw new IllegalStateException("only basic licenses are allowed to have no expiration");
    }
}

public static License readLicense(StreamInput in) throws IOException {
    int version = in.readVInt(); // Version for future extensibility
    if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
elasticsearch-license" +
        " plugin");
    }
    Builder builder = builder();
    builder.version(version);
    builder.uid(in.readString());
    builder.type(in.readString());
    if (version == VERSION_START) {
        builder.subscriptionType(in.readString());
    }
    builder.issueDate(in.readLong());
    if (version == VERSION_START) {

```

```

        builder.feature(in.readString());
    }
    builder.expiryDate(in.readLong());
    builder.maxNodes(in.readInt());
    builder.issuedTo(in.readString());
    builder.issuer(in.readString());
    builder.signature(in.readOptionalString());
    if (version >= VERSION_START_DATE) {
        builder.startDate(in.readLong());
    }
    return builder.build();
}

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(version);
    out.writeString(uid);
    out.writeString(type);
    if (version == VERSION_START) {
        out.writeString(subscriptionType);
    }
    out.writeLong(issueDate);
    if (version == VERSION_START) {
        out.writeString(feature);
    }
    out.writeLong(expiryDate);
    out.writeInt(maxNodes);
    out.writeString(issuedTo);
    out.writeString(issuer);
    out.writeOptionalString(signature);
    if (version >= VERSION_START_DATE) {
        out.writeLong(startDate);
    }
}

@Override
public String toString() {
    try {
        final XContentBuilder builder = XContentFactory.jsonBuilder();
        toXContent(builder, ToXContent.EMPTY_PARAMS);
        return Strings.toString(builder);
    } catch (IOException e) {
        return "";
    }
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();

```

```

toInnerXContent(builder, params);
builder.endObject();
return builder;
}

public XContentBuilder toInnerXContent(XContentBuilder builder, Params params) throws IOException {
    boolean licenseSpecMode = params.paramAsBoolean(LICENSE_SPEC_VIEW_MODE, false);
    boolean restViewMode = params.paramAsBoolean(REST_VIEW_MODE, false);
    boolean previouslyHumanReadable = builder.humanReadable();
    if (licenseSpecMode && restViewMode) {
        throw new IllegalArgumentException("can have either " + REST_VIEW_MODE + " or " +
LICENSE_SPEC_VIEW_MODE);
    } else if (restViewMode) {
        if (!previouslyHumanReadable) {
            builder.humanReadable(true);
        }
    }
    final int version;
    if (params.param(LICENSE_VERSION_MODE) != null && restViewMode) {
        version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
    } else {
        version = this.version;
    }
    if (restViewMode) {
        builder.field(Fields.STATUS, status().label());
    }
    builder.field(Fields.UID, uid);
    builder.field(Fields.TYPE, type);
    if (version == VERSION_START) {
        builder.field(Fields.SUBSCRIPTION_TYPE, subscriptionType);
    }
    builder.timeField(Fields.ISSUE_DATE_IN_MILLIS, Fields.ISSUE_DATE, issueDate);
    if (version == VERSION_START) {
        builder.field(Fields.FEATURE, feature);
    }

    if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
        builder.timeField(Fields.EXPIRY_DATE_IN_MILLIS, Fields.EXPIRY_DATE, expiryDate);
    }
    builder.field(Fields.MAX_NODES, maxNodes);
    builder.field(Fields.ISSUED_TO, issuedTo);
    builder.field(Fields.ISSUER, issuer);
    if (!licenseSpecMode && !restViewMode && signature != null) {
        builder.field(Fields.SIGNATURE, signature);
    }
    if (restViewMode) {
        builder.humanReadable(previouslyHumanReadable);
    }
}

```



```

if (version >= VERSION_START_DATE) {
    builder.timeField(Fields.START_DATE_IN_MILLIS, Fields.START_DATE, startDate);
}
return builder;
}

```

```

public static License fromXContent(XContentParser parser) throws IOException {
    Builder builder = new Builder();
    XContentParser.Token token;
    while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
        if (token == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            token = parser.nextToken();
            if (token.isValue()) {
                if (Fields.UID.equals(currentFieldName)) {
                    builder.uid(parser.text());
                } else if (Fields.TYPE.equals(currentFieldName)) {
                    builder.type(parser.text());
                } else if (Fields.SUBSCRIPTION_TYPE.equals(currentFieldName)) {
                    builder.subscriptionType(parser.text());
                } else if (Fields.ISSUE_DATE.equals(currentFieldName)) {
                    builder.issueDate(parseDate(parser, "issue", false));
                } else if (Fields.ISSUE_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.issueDate(parser.longValue());
                } else if (Fields.FEATURE.equals(currentFieldName)) {
                    builder.feature(parser.text());
                } else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
                    builder.expiryDate(parseDate(parser, "expiration", true));
                } else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.expiryDate(parser.longValue());
                } else if (Fields.START_DATE.equals(currentFieldName)) {
                    builder.startDate(parseDate(parser, "start", false));
                } else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
                    builder.startDate(parser.longValue());
                } else if (Fields.MAX_NODES.equals(currentFieldName)) {
                    builder.maxNodes(parser.intValue());
                } else if (Fields.ISSUED_TO.equals(currentFieldName)) {
                    builder.issuedTo(parser.text());
                } else if (Fields.ISSUER.equals(currentFieldName)) {
                    builder.issuer(parser.text());
                } else if (Fields.SIGNATURE.equals(currentFieldName)) {
                    builder.signature(parser.text());
                } else if (Fields.VERSION.equals(currentFieldName)) {
                    builder.version(parser.intValue());
                }
                // Ignore unknown elements - might be new version of license
            } else if (token == XContentParser.Token.START_ARRAY) {
                // It was probably created by newer version - ignoring
            }
        }
    }
}

```

```

        parser.skipChildren();
    } else if (token == XContentParser.Token.START_OBJECT) {
        // It was probably created by newer version - ignoring
        parser.skipChildren();
    }
}
}
// not a license spec
if (builder.signature != null) {
    byte[] signatureBytes = Base64.getDecoder().decode(builder.signature);
    ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
    int version = byteBuffer.getInt();
    // we take the absolute version, because negative versions
    // mean that the license was generated by the cluster (see TrialLicense)
    // and positive version means that the license was signed
    if (version < 0) {
        version *= -1;
    }
    if (version == 0) {
        throw new ElasticsearchException("malformed signature for license [" + builder.uid + "]");
    } else if (version > VERSION_CURRENT) {
        throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
" +
        "elasticsearch-license plugin");
    }
    // signature version is the source of truth
    builder.version(version);
}
return builder.build();
}

/**
 * Returns true if the license was auto-generated (by license plugin),
 * false otherwise
 */
public static boolean isAutoGeneratedLicense(String signature) {
    try {
        byte[] signatureBytes = Base64.getDecoder().decode(signature);
        ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
        return byteBuffer.getInt() < 0;
    } catch (IllegalArgumentException e) {
        throw new IllegalStateException(e);
    }
}

public static License fromSource(BytesReference bytes, XContentType xContentType) throws IOException {
    if (bytes == null || bytes.length() == 0) {
        throw new ElasticsearchParseException("failed to parse license - no content provided");
    }
}

```

```

}
if (xContentType == null) {
    throw new ElasticsearchParseException("failed to parse license - no content-type provided");
}
// EMPTY is safe here because we don't call namedObject
try (InputStream byteStream = bytes.streamInput();
    XContentParser parser = xContentType.xContent()
        .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE, byteStream))
{
    License license = null;
    if (parser.nextToken() == XContentParser.Token.START_OBJECT) {
        if (parser.nextToken() == XContentParser.Token.FIELD_NAME) {
            String currentFieldName = parser.currentName();
            if (Fields.LICENSES.equals(currentFieldName)) {
                final List<License> pre20Licenses = new ArrayList<>();
                if (parser.nextToken() == XContentParser.Token.START_ARRAY) {
                    while (parser.nextToken() != XContentParser.Token.END_ARRAY) {
                        pre20Licenses.add(License.fromXContent(parser));
                    }
                    // take the latest issued unexpired license
                    CollectionUtil.timSort(pre20Licenses, LATEST_ISSUE_DATE_FIRST);
                    long now = System.currentTimeMillis();
                    for (License oldLicense : pre20Licenses) {
                        if (oldLicense.expiryDate() > now) {
                            license = oldLicense;
                            break;
                        }
                    }
                    if (license == null && !pre20Licenses.isEmpty()) {
                        license = pre20Licenses.get(0);
                    }
                } else {
                    throw new ElasticsearchParseException("failed to parse licenses expected an array of licenses");
                }
            } else if (Fields.LICENSE.equals(currentFieldName)) {
                license = License.fromXContent(parser);
            }
            // Ignore all other fields - might be created with new version
        } else {
            throw new ElasticsearchParseException("failed to parse licenses expected field");
        }
    } else {
        throw new ElasticsearchParseException("failed to parse licenses expected start object");
    }
    return license;
}
}

```

```

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;

    License license = (License) o;

    if (issueDate != license.issueDate) return false;
    if (expiryDate != license.expiryDate) return false;
    if (startDate != license.startDate) return false;
    if (maxNodes != license.maxNodes) return false;
    if (version != license.version) return false;
    if (uid != null ? !uid.equals(license.uid) : license.uid != null) return false;
    if (issuer != null ? !issuer.equals(license.issuer) : license.issuer != null) return false;
    if (issuedTo != null ? !issuedTo.equals(license.issuedTo) : license.issuedTo != null) return false;
    if (type != null ? !type.equals(license.type) : license.type != null) return false;
    if (subscriptionType != null ? !subscriptionType.equals(license.subscriptionType) : license.subscriptionType !=
null)
        return false;
    if (feature != null ? !feature.equals(license.feature) : license.feature != null) return false;
    return !(signature != null ? !signature.equals(license.signature) : license.signature != null);
}

```

```

@Override
public int hashCode() {
    int result = uid != null ? uid.hashCode() : 0;
    result = 31 * result + (issuer != null ? issuer.hashCode() : 0);
    result = 31 * result + (issuedTo != null ? issuedTo.hashCode() : 0);
    result = 31 * result + (int) (issueDate ^ (issueDate >>> 32));
    result = 31 * result + (type != null ? type.hashCode() : 0);
    result = 31 * result + (subscriptionType != null ? subscriptionType.hashCode() : 0);
    result = 31 * result + (feature != null ? feature.hashCode() : 0);
    result = 31 * result + (signature != null ? signature.hashCode() : 0);
    result = 31 * result + (int) (expiryDate ^ (expiryDate >>> 32));
    result = 31 * result + (int) (startDate ^ (startDate >>> 32));
    result = 31 * result + maxNodes;
    result = 31 * result + version;
    return result;
}

```

```

public static final class Fields {
    public static final String STATUS = "status";
    public static final String UID = "uid";
    public static final String TYPE = "type";
    public static final String SUBSCRIPTION_TYPE = "subscription_type";
    public static final String ISSUE_DATE_IN_MILLIS = "issue_date_in_millis";
    public static final String ISSUE_DATE = "issue_date";
}

```

```

public static final String FEATURE = "feature";
public static final String EXPIRY_DATE_IN_MILLIS = "expiry_date_in_millis";
public static final String EXPIRY_DATE = "expiry_date";
public static final String START_DATE_IN_MILLIS = "start_date_in_millis";
public static final String START_DATE = "start_date";
public static final String MAX_NODES = "max_nodes";
public static final String ISSUED_TO = "issued_to";
public static final String ISSUER = "issuer";
public static final String VERSION = "version";
public static final String SIGNATURE = "signature";

public static final String LICENSES = "licenses";
public static final String LICENSE = "license";

}

private static long parseDate(XContentParser parser, String description, boolean endOfDay) throws
IOException {
    if (parser.currentToken() == XContentParser.Token.VALUE_NUMBER) {
        return parser.longValue();
    } else {
        try {
            if (endOfDay) {
                return DateUtils.endOfDay(parser.text());
            } else {
                return DateUtils.beginningOfDay(parser.text());
            }
        } catch (IllegalArgumentException ex) {
            throw new ElasticsearchParseException("invalid " + description + " date format " + parser.text());
        }
    }
}

public static Builder builder() {
    return new Builder();
}

public static class Builder {
    private int version = License.VERSION_CURRENT;
    private String uid;
    private String issuer;
    private String issuedTo;
    private long issueDate = -1;
    private String type;
    private String subscriptionType;
    private String feature;
    private String signature;
    private long expiryDate = -1;
}

```

```
private long startDate = -1;
private int maxNodes = -1;

public Builder uid(String uid) {
    this.uid = uid;
    return this;
}

public Builder version(int version) {
    this.version = version;
    return this;
}

public Builder issuer(String issuer) {
    this.issuer = issuer;
    return this;
}

public Builder issuedTo(String issuedTo) {
    this.issuedTo = issuedTo;
    return this;
}

public Builder issueDate(long issueDate) {
    this.issueDate = issueDate;
    return this;
}

public Builder type(String type) {
    this.type = type;
    return this;
}

public Builder subscriptionType(String subscriptionType) {
    this.subscriptionType = subscriptionType;
    return this;
}

public Builder feature(String feature) {
    this.feature = feature;
    return this;
}

public Builder expiryDate(long expiryDate) {
    this.expiryDate = expiryDate;
    return this;
}
```

```

public Builder maxNodes(int maxNodes) {
    this.maxNodes = maxNodes;
    return this;
}

public Builder signature(String signature) {
    if (signature != null) {
        this.signature = signature;
    }
    return this;
}

public Builder startDate(long startDate) {
    this.startDate = startDate;
    return this;
}

public Builder fromLicenseSpec(License license, String signature) {
    return uid(license.uid())
        .version(license.version())
        .issuedTo(license.issuedTo())
        .issueDate(license.issueDate())
        .startDate(license.startDate())
        .type(license.type())
        .subscriptionType(license.subscriptionType)
        .feature(license.feature)
        .maxNodes(license.maxNodes())
        .expiryDate(license.expiryDate())
        .issuer(license.issuer())
        .signature(signature);
}

/**
 * Returns a builder that converts pre 2.0 licenses
 * to the new license format
 */
public Builder fromPre20LicenseSpec(License pre20License) {
    return uid(pre20License.uid())
        .issuedTo(pre20License.issuedTo())
        .issueDate(pre20License.issueDate())
        .maxNodes(pre20License.maxNodes())
        .expiryDate(pre20License.expiryDate());
}

public License build() {
    return new License(version, uid, issuer, issuedTo, issueDate, type,
        subscriptionType, feature, signature, expiryDate, maxNodes, startDate);
}

```

```

public Builder validate() {
    if (issuer == null) {
        throw new IllegalStateException("issuer can not be null");
    } else if (issuedTo == null) {
        throw new IllegalStateException("issuedTo can not be null");
    } else if (issueDate == -1) {
        throw new IllegalStateException("issueDate has to be set");
    } else if (type == null) {
        throw new IllegalStateException("type can not be null");
    } else if (uid == null) {
        throw new IllegalStateException("uid can not be null");
    } else if (signature == null) {
        throw new IllegalStateException("signature can not be null");
    } else if (maxNodes == -1) {
        throw new IllegalStateException("maxNodes has to be set");
    } else if (expiryDate == -1) {
        throw new IllegalStateException("expiryDate has to be set");
    }
    return this;
}
}

```

```

public enum Status {

    ACTIVE("active"),
    INVALID("invalid"),
    EXPIRED("expired");

    private final String label;

    Status(String label) {
        this.label = label;
    }

    public String label() {
        return label;
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(label);
    }

    public static Status readFrom(StreamInput in) throws IOException {
        String value = in.readString();
        switch (value) {
            case "active":
                return ACTIVE;
        }
    }
}

```



```

        case "invalid":
            return INVALID;
        case "expired":
            return EXPIRED;
        default:
            throw new IllegalArgumentException("unknown license status [" + value + "]");
    }
}
}

/**
 * Returns <code>true</code> iff the license is a production license
 */
public boolean isProductionLicense() {
    switch (operationMode()) {
        case MISSING:
        case TRIAL:
        case BASIC:
            return false;
        case STANDARD:
        case GOLD:
        case PLATINUM:
            return true;
        default:
            throw new AssertionError("unknown operation mode: " + operationMode());
    }
}
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestController.Method.POST;
import static org.elasticsearch.rest.RestController.Method.PUT;

```

```

public class RestPutLicenseAction extends XPackRestHandler {
    public RestPutLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(POST, URI_BASE + "/license", this,
            POST, "/_license", deprecationLogger);
        controller.registerWithDeprecatedHandler(PUT, URI_BASE + "/license", this,
            PUT, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(POST, "/_licenses", this,
            "[POST /_licenses] is deprecated! Use " +
            "[POST /_xpack/license] instead.",
            deprecationLogger);
        controller.registerAsDeprecatedHandler(PUT, "/_licenses", this,
            "[PUT /_licenses] is deprecated! Use " +
            "[PUT /_xpack/license] instead.",
            deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_put_license_action";
    }

    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        if (request.hasContent() == false) {
            throw new IllegalArgumentException("The license must be provided in the request body");
        }
        PutLicenseRequest putLicenseRequest = new PutLicenseRequest();
        putLicenseRequest.license(request.content(), request.getXContentType());
        putLicenseRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
        putLicenseRequest.timeout(request.paramAsTime("timeout", putLicenseRequest.timeout()));
        putLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
putLicenseRequest.masterNodeTimeout()));

        if ("basic".equals(putLicenseRequest.license().type())) {
            throw new IllegalArgumentException("Installing basic licenses is no longer allowed. Use the POST " +
                "/_xpack/license/start_basic API to install a basic license that does not expire.");
        }

        return channel -> client.es().admin().cluster().execute(PutLicenseAction.INSTANCE, putLicenseRequest,
            new RestToXContentListener<>(channel));
    }
}

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class GetLicenseResponse extends ActionResponse {

    private License license;

    GetLicenseResponse() {
    }

    GetLicenseResponse(License license) {
        this.license = license;
    }

    public License license() {
        return license;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
        if (in.readBoolean()) {
            license = License.readLicense(in);
        }
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        if (license == null) {
            out.writeBoolean(false);
        } else {
            out.writeBoolean(true);
            license.writeTo(out);
        }
    }
}

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.MasterNodeReadOperationRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseRequestBuilder extends MasterNodeReadOperationRequestBuilder<GetLicenseRequest,
GetLicenseResponse,
    GetLicenseRequestBuilder> {

    public GetLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, GetLicenseAction.INSTANCE);
    }

    /**
     * Creates new get licenses request builder
     *
     * @param client elasticsearch client
     */
    public GetLicenseRequestBuilder(ElasticsearchClient client, GetLicenseAction action) {
        super(client, action, new GetLicenseRequest());
    }
}

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetLicenseRequest extends MasterNodeReadRequest<GetLicenseRequest> {

    public GetLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartTrialAction extends TransportMasterNodeAction<PostStartTrialRequest,
PostStartTrialResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPostStartTrialAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                     LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                     IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PostStartTrialAction.NAME, transportService, clusterService, threadPool, actionFilters,
              indexNameExpressionResolver, PostStartTrialRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected PostStartTrialResponse newResponse() {
        return new PostStartTrialResponse();
    }

    @Override
    protected void masterOperation(PostStartTrialRequest request, ClusterState state,
                                   ActionListener<PostStartTrialResponse> listener) throws Exception {

```

```

        licenseService.startTrialLicense(request, listener);
    }

    @Override
    protected ClusterBlockException checkBlock(PostStartTrialRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.GET;
import static org.elasticsearch.rest.RestStatus.NOT_FOUND;
import static org.elasticsearch.rest.RestStatus.OK;

public class RestGetLicenseAction extends XPackRestHandler {

    @Inject
    public RestGetLicenseAction(Settings settings, RestController controller) {
        super(settings);
        // @deprecated Remove deprecations in 6.0
        controller.registerWithDeprecatedHandler(GET, URI_BASE + "/license", this,
            GET, "/_license", deprecationLogger);

        // Remove _licenses support entirely in 6.0
        controller.registerAsDeprecatedHandler(GET, "/_licenses", this,
            "[GET /_licenses] is deprecated! Use " +
            "[GET /_xpack/license] instead.",

```

```

        deprecationLogger);
    }

    @Override
    public String getName() {
        return "xpack_get_license_action";
    }

    /**
     * There will be only one license displayed per feature, the selected license will have the latest expiry_date
     * out of all other licenses for the feature.
     * <p>
     * The licenses are sorted by latest issue_date
     */
    @Override
    public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
    IOException {
        final Map<String, String> overrideParams = new HashMap<>(2);
        overrideParams.put(License.REST_VIEW_MODE, "true");
        overrideParams.put(License.LICENSE_VERSION_MODE, String.valueOf(License.VERSION_CURRENT));
        final ToXContent.Params params = new ToXContent.DelegatingMapParams(overrideParams, request);
        GetLicenseRequest getLicenseRequest = new GetLicenseRequest();
        getLicenseRequest.local(request.paramAsBoolean("local", getLicenseRequest.local()));
        return channel -> client.es().admin().cluster().execute(GetLicenseAction.INSTANCE, getLicenseRequest,
            new RestBuilderListener<GetLicenseResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetLicenseResponse response, XContentBuilder builder) throws
                Exception {
                    // Default to pretty printing, but allow ?pretty=false to disable
                    if (!request.hasParam("pretty")) {
                        builder.prettyPrint().IfAtEnd();
                    }
                    boolean hasLicense = response.license() != null;
                    builder.startObject();
                    if (hasLicense) {
                        builder.startObject("license");
                        response.license().toInnerXContent(builder, params);
                        builder.endObject();
                    }
                    builder.endObject();
                    return new BytesRestResponse(hasLicense ? OK : NOT_FOUND, builder);
                }
            });
    }

    }

    /**
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```

```

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*/
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Register license request builder
 */
public class PutLicenseRequestBuilder extends AcknowledgedRequestBuilder<PutLicenseRequest,
PutLicenseResponse, PutLicenseRequestBuilder> {

    public PutLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, PutLicenseAction.INSTANCE);
    }

    /**
     * Constructs register license request
     *
     * @param client elasticsearch client
     */
    public PutLicenseRequestBuilder(ElasticsearchClient client, PutLicenseAction action) {
        super(client, action, new PutLicenseRequest());
    }

    /**
     * Sets the license
     *
     * @param license license
     * @return this builder
     */
    public PutLicenseRequestBuilder setLicense(License license) {
        request.license(license);
        return this;
    }

    public PutLicenseRequestBuilder setLicense(BytesReference licenseSource, XContentType xContentType) {
        request.license(licenseSource, xContentType);
        return this;
    }

    public PutLicenseRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }

```



```

    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetBasicStatusAction extends Action<GetBasicStatusRequest, GetBasicStatusResponse,
GetBasicStatusRequestBuilder> {

    public static final GetBasicStatusAction INSTANCE = new GetBasicStatusAction();
    public static final String NAME = "cluster:admin/xpack/license/basic_status";

    private GetBasicStatusAction() {
        super(NAME);
    }

    @Override
    public GetBasicStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new GetBasicStatusRequestBuilder(client, this);
    }

    @Override
    public GetBasicStatusResponse newResponse() {
        return new GetBasicStatusResponse();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.rest.RestStatus;

public class LicenseUtils {

    public static final String EXPIRED_FEATURE_METADATA = "es.license.expired.feature";

    /**
     * Exception to be thrown when a feature action requires a valid license, but license

```

```

* has expired
*
* <code>feature</code> accessible through { @link #EXPIRED_FEATURE_METADATA } in the
* exception's rest header
*/
public static ElasticsearchSecurityException newComplianceException(String feature) {
    ElasticsearchSecurityException e = new ElasticsearchSecurityException("current license is non-compliant for
[{}]",
        RestStatus.FORBIDDEN, feature);
    e.addMetadata(EXPIRED_FEATURE_METADATA, feature);
    return e;
}

/**
* Checks if a given { @link ElasticsearchSecurityException } refers to a feature that
* requires a valid license, but the license has expired.
*/
public static boolean isLicenseExpiredException(ElasticsearchSecurityException exception) {
    return (exception != null) && (exception.getMetadata(EXPIRED_FEATURE_METADATA) != null);
}

public static boolean licenseNeedsExtended(License license) {
    return "basic".equals(license.type()) && license.expiryDate() !=
LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
}
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequest;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.ParseField;
import org.elasticsearch.common.io.stream.NamedWriteableRegistry;
import org.elasticsearch.common.settings.ClusterSettings;
import org.elasticsearch.common.settings.IndexScopedSettings;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.settings.SettingsFilter;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.plugins.ActionPlugin;

```

```

import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.function.Supplier;

import static org.elasticsearch.xpack.core.XPackClientActionPlugin.isTribeNode;
import static org.elasticsearch.xpack.core.XPackPlugin.transportClientMode;

public class Licensing implements ActionPlugin {

    public static final String NAME = "license";
    protected final Settings settings;
    private final boolean isTransportClient;
    private final boolean isTribeNode;

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
    to this file
    // are also carried out in XPackClientPlugin.java
    public List<NamedWriteableRegistry.Entry> getNamedWriteables() {
        List<NamedWriteableRegistry.Entry> entries = new ArrayList<>();
        entries.add(new NamedWriteableRegistry.Entry(MetaData.Custom.class, LicensesMetaData.TYPE,
LicensesMetaData::new));
        entries.add(new NamedWriteableRegistry.Entry(NamedDiff.class, LicensesMetaData.TYPE,
LicensesMetaData::readDiffFrom));
        return entries;
    }

    // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
    to this file
    // are also carried out in XPackClientPlugin.java
    public List<NamedXContentRegistry.Entry> getNamedXContent() {
        List<NamedXContentRegistry.Entry> entries = new ArrayList<>();
        // Metadata
        entries.add(new NamedXContentRegistry.Entry(MetaData.Custom.class, new
ParseField(LicensesMetaData.TYPE),
        LicensesMetaData::fromXContent));
        return entries;
    }

    public Licensing(Settings settings) {
        this.settings = settings;
        isTransportClient = transportClientMode(settings);
        isTribeNode = isTribeNode(settings);
    }
}

```

```

@Override
public List<ActionHandler<? extends ActionRequest, ? extends ActionResponse>> getActions() {
    if (isTribeNode) {
        return Collections.singletonList(new ActionHandler<>(GetLicenseAction.INSTANCE,
TransportGetLicenseAction.class));
    }
    return Arrays.asList(new ActionHandler<>(PutLicenseAction.INSTANCE, TransportPutLicenseAction.class),
        new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class),
        new ActionHandler<>(DeleteLicenseAction.INSTANCE, TransportDeleteLicenseAction.class),
        new ActionHandler<>(PostStartTrialAction.INSTANCE, TransportPostStartTrialAction.class),
        new ActionHandler<>(GetTrialStatusAction.INSTANCE, TransportGetTrialStatusAction.class),
        new ActionHandler<>(PostStartBasicAction.INSTANCE, TransportPostStartBasicAction.class),
        new ActionHandler<>(GetBasicStatusAction.INSTANCE, TransportGetBasicStatusAction.class));
}

```

```

@Override
public List<RestHandler> getRestHandlers(Settings settings, RestController restController, ClusterSettings
clusterSettings,
    IndexScopedSettings indexScopedSettings, SettingsFilter settingsFilter, IndexNameExpressionResolver
indexNameExpressionResolver,
    Supplier<DiscoveryNodes> nodesInCluster) {
    List<RestHandler> handlers = new ArrayList<>();
    handlers.add(new RestGetLicenseAction(settings, restController));
    if (false == isTribeNode) {
        handlers.add(new RestPutLicenseAction(settings, restController));
        handlers.add(new RestDeleteLicenseAction(settings, restController));
        handlers.add(new RestGetTrialStatus(settings, restController));
        handlers.add(new RestGetBasicStatus(settings, restController));
        handlers.add(new RestPostStartTrialLicense(settings, restController));
        handlers.add(new RestPostStartBasicLicense(settings, restController));
    }
    return handlers;
}

```

// Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits to this file

```

// are also carried out in XPackClientPlugin.java
public List<Setting<?>> getSettings() {
    // TODO convert this wildcard to a real setting
    return Collections.singletonList(Setting.groupSetting("license.", Setting.Property.NodeScope));
}

```

```

}
/*

```

```

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```

```

*/
package org.elasticsearch.license;

import javax.crypto.BadPaddingException;
import javax.crypto.Cipher;
import javax.crypto.IllegalBlockSizeException;
import javax.crypto.NoSuchPaddingException;
import javax.crypto.SecretKey;
import javax.crypto.SecretKeyFactory;
import javax.crypto.spec.PBEKeySpec;
import javax.crypto.spec.SecretKeySpec;
import java.nio.charset.StandardCharsets;
import java.security.InvalidKeyException;
import java.security.KeyFactory;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.spec.InvalidKeySpecException;
import java.security.spec.PKCS8EncodedKeySpec;
import java.security.spec.X509EncodedKeySpec;
import java.util.Base64;

public class CryptUtils {
    private static final int minimumPadding = 20;
    private static final byte[] salt = {
        (byte) 0xA9, (byte) 0xA2, (byte) 0xB5, (byte) 0xDE,
        (byte) 0x2A, (byte) 0x8A, (byte) 0x9A, (byte) 0xE6
    };
    private static final int iterationCount = 1024;
    private static final int aesKeyLength = 128;
    private static final String keyAlgorithm = "RSA";
    private static final String passHashAlgorithm = "SHA-512";
    private static final String DEFAULT_PASS_PHRASE = "elasticsearch-license";

    private static final SecureRandom random = new SecureRandom();

    /**
     * Read encrypted private key file content with default pass phrase
     */
    public static PrivateKey readEncryptedPrivateKey(byte[] fileContents) {
        try {
            return readEncryptedPrivateKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
        } catch (NoSuchAlgorithmException e) {
            throw new IllegalStateException(e);
        }
    }
}

```

```

}

/**
 * Read encrypted public key file content with default pass phrase
 */
public static PublicKey readEncryptedPublicKey(byte[] fileContents) {
    try {
        return readEncryptedPublicKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Returns encrypted public key file content with default pass phrase
 */
public static byte[] writeEncryptedPublicKey(PublicKey publicKey) {
    try {
        return writeEncryptedPublicKey(publicKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Returns encrypted private key file content with default pass phrase
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey) {
    try {
        return writeEncryptedPrivateKey(privateKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Read encrypted private key file content with provided <code>passPhrase</code>
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents, char[] passPhrase) {
    PKCS8EncodedKeySpec privateKeySpec = new PKCS8EncodedKeySpec(decrypt(fileContents, passPhrase));
    try {
        return KeyFactory.getInstance(keyAlgorithm).generatePrivate(privateKeySpec);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

/**

```

```

* Read encrypted public key file content with provided <code>passPhrase</code>
*/
public static PublicKey readEncryptedPublicKey(byte[] fileContents, char[] passPhrase) {
    X509EncodedKeySpec publicKeySpec = new X509EncodedKeySpec(decrypt(fileContents, passPhrase));
    try {
        return KeyFactory.getInstance(CryptUtils.keyAlgorithm).generatePublic(publicKeySpec);
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

/**
* Returns encrypted public key file content with provided <code>passPhrase</code>
*/
public static byte[] writeEncryptedPublicKey(PublicKey publicKey, char[] passPhrase) {
    X509EncodedKeySpec encodedKeySpec = new X509EncodedKeySpec(publicKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
* Returns encrypted private key file content with provided <code>passPhrase</code>
*/
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey, char[] passPhrase) {
    PKCS8EncodedKeySpec encodedKeySpec = new PKCS8EncodedKeySpec(privateKey.getEncoded());
    return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
* Encrypts provided <code>data</code> with <code>DEFAULT_PASS_PHRASE</code>
*/
public static byte[] encrypt(byte[] data) {
    try {
        return encrypt(data, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

/**
* Decrypts provided <code>encryptedData</code> with <code>DEFAULT_PASS_PHRASE</code>
*/
public static byte[] decrypt(byte[] encryptedData) {
    try {
        return decrypt(encryptedData, hashPassPhrase(DEFAULT_PASS_PHRASE));
    } catch (NoSuchAlgorithmException e) {
        throw new IllegalStateException(e);
    }
}

```

```

/**
 * Encrypts provided <code>data</code> with <code>passPhrase</code>
 */
public static byte[] encrypt(byte[] data, char[] passPhrase) {
    try {
        final Cipher encryptionCipher = getEncryptionCipher(getSecretKey(passPhrase));
        return encryptionCipher.doFinal(pad(data, minimumPadding));
    } catch (InvalidKeySpecException | IllegalBlockSizeException | BadPaddingException e) {
        throw new IllegalStateException(e);
    }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>passPhrase</code>
 */
private static byte[] decrypt(byte[] encryptedData, char[] passPhrase) {
    try {
        final Cipher cipher = getDecryptionCipher(getSecretKey(passPhrase));
        return unPad(cipher.doFinal(encryptedData));
    } catch (IllegalBlockSizeException | BadPaddingException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

private static SecretKey getSecretKey(char[] passPhrase) throws InvalidKeySpecException {
    try {
        PBEKeySpec keySpec = new PBEKeySpec(passPhrase, salt, iterationCount, aesKeyLength);

        byte[] shortKey = SecretKeyFactory.getInstance("PBESWithSHA1AndDESede").
            generateSecret(keySpec).getEncoded();

        byte[] intermediaryKey = new byte[aesKeyLength / 8];
        for (int i = 0, j = 0; i < aesKeyLength / 8; i++) {
            intermediaryKey[i] = shortKey[j];
            if (++j == shortKey.length)
                j = 0;
        }

        return new SecretKeySpec(intermediaryKey, "AES");
    } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
        throw new IllegalStateException(e);
    }
}

private static Cipher getEncryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.ENCRYPT_MODE, secretKey);
}

```



```

}

private static Cipher getDecryptionCipher(SecretKey secretKey) {
    return getCipher(Cipher.DECRYPT_MODE, secretKey);
}

private static Cipher getCipher(int mode, SecretKey secretKey) {
    try {
        Cipher cipher = Cipher.getInstance(secretKey.getAlgorithm());
        cipher.init(mode, secretKey, random);
        return cipher;
    } catch (NoSuchAlgorithmException | InvalidKeyException | NoSuchPaddingException e) {
        throw new IllegalStateException(e);
    }
}

private static byte[] pad(byte[] bytes, int length) {
    if (bytes.length >= length) {
        byte[] out = new byte[bytes.length + 1];
        System.arraycopy(bytes, 0, out, 0, bytes.length);
        out[bytes.length] = (byte) 1;
        return out;
    }

    byte[] out = new byte[length + 1];

    int i = 0;
    for (; i < bytes.length; i++)
        out[i] = bytes[i];

    int padded = length - i;

    // fill the rest with random bytes
    byte[] fill = new byte[padded - 1];
    random.nextBytes(fill);
    System.arraycopy(fill, 0, out, i, padded - 1);

    out[length] = (byte) (padded + 1);

    return out;
}

private static byte[] unPad(byte[] bytes) {
    int padded = (int) bytes[bytes.length - 1];
    int targetLength = bytes.length - padded;

    byte[] out = new byte[targetLength];

```

```

        System.arraycopy(bytes, 0, out, 0, targetLength);

        return out;
    }

    private static char[] hashPassPhrase(String passPhrase) throws NoSuchAlgorithmException {
        final byte[] passBytes = passPhrase.getBytes(StandardCharsets.UTF_8);
        final byte[] digest = MessageDigest.getInstance(passHashAlgorithm).digest(passBytes);
        return Base64.getEncoder().encodeToString(digest).toCharArray();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

class PostStartTrialResponse extends ActionResponse {

    // Nodes Prior to 6.3 did not have NEED_ACKNOWLEDGEMENT as part of status
    enum Pre63Status {
        UPGRADED_TO_TRIAL,
        TRIAL_ALREADY_ACTIVATED;
    }

    enum Status {
        UPGRADED_TO_TRIAL(true, null, RestStatus.OK),
        TRIAL_ALREADY_ACTIVATED(false, "Operation failed: Trial was already activated.",
RestStatus.FORBIDDEN),
        NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

        private final boolean isTrialStarted;

        private final String errorMessage;
        private final RestStatus restStatus;
        Status(boolean isTrialStarted, String errorMessage, RestStatus restStatus) {
            this.isTrialStarted = isTrialStarted;

```

```

        this.errorMessage = errorMessage;
        this.restStatus = restStatus;
    }

    boolean isTrialStarted() {
        return isTrialStarted;
    }

    String getErrorMessage() {
        return errorMessage;
    }

    RestStatus getRestStatus() {
        return restStatus;
    }
}

private Status status;
private Map<String, String[]> acknowledgeMessages;
private String acknowledgeMessage;

PostStartTrialResponse() {
}

PostStartTrialResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartTrialResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage)
{
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    status = in.readEnum(Status.class);
    if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
        acknowledgeMessage = in.readOptionalString();
        int size = in.readVInt();
        Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
        for (int i = 0; i < size; i++) {

```

```

    String feature = in.readString();
    int nMessages = in.readVInt();
    String[] messages = new String[nMessages];
    for (int j = 0; j < nMessages; j++) {
        messages[j] = in.readString();
    }
    acknowledgeMessages.put(feature, messages);
}
this.acknowledgeMessages = acknowledgeMessages;
} else {
    this.acknowledgeMessages = Collections.emptyMap();
}
}

```

@Override

```

public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        out.writeEnum(status);
        out.writeOptionalString(acknowledgeMessage);
        out.writeVInt(acknowledgeMessages.size());
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            out.writeString(entry.getKey());
            out.writeVInt(entry.getValue().length);
            for (String message : entry.getValue()) {
                out.writeString(message);
            }
        }
    } else {
        if (status == Status.UPGRADED_TO_TRIAL) {
            out.writeEnum(Pre63Status.UPGRADED_TO_TRIAL);
        } else if (status == Status.TRIAL_ALREADY_ACTIVATED) {
            out.writeEnum(Pre63Status.TRIAL_ALREADY_ACTIVATED);
        } else {
            throw new IllegalArgumentException("Starting trial on node with version [" + Version.CURRENT + "]
requires " +
                "acknowledgement parameter.");
        }
    }
}

```

```

Map<String, String[]> getAcknowledgementMessages() {
    return acknowledgeMessages;
}

```

```

String getAcknowledgementMessage() {
    return acknowledgeMessage;
}

```

```

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.io.stream.Writeable;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.xpack.core.XPackBuild;

import java.io.IOException;
import java.util.ArrayList;
import java.util.Collections;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.stream.Collectors;

public class XPackInfoResponse extends ActionResponse {

    @Nullable private BuildInfo buildInfo;
    @Nullable private LicenseInfo licenseInfo;
    @Nullable private FeatureSetsInfo featureSetsInfo;

    public XPackInfoResponse() {}

    public XPackInfoResponse(@Nullable BuildInfo buildInfo, @Nullable LicenseInfo licenseInfo, @Nullable
FeatureSetsInfo featureSetsInfo) {
        this.buildInfo = buildInfo;
        this.licenseInfo = licenseInfo;
        this.featureSetsInfo = featureSetsInfo;
    }

    /**
     * @return The build info (incl. build hash and timestamp)
     */
    public BuildInfo getBuildInfo() {
        return buildInfo;
    }

```

```

    }

    /**
     * @return The current license info (incl. UID, type/mode, status and expiry date). May return {@code null}
when no
     *     license is currently installed.
     */
    public LicenseInfo getLicenseInfo() {
        return licenseInfo;
    }

    /**
     * @return The current status of the feature sets in X-Pack. Feature sets describe the features available/enabled in
X-Pack.
     */
    public FeatureSetsInfo getFeatureSetsInfo() {
        return featureSetsInfo;
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
        out.writeOptionalWriteable(buildInfo);
        out.writeOptionalWriteable(licenseInfo);
        out.writeOptionalWriteable(featureSetsInfo);
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        this.buildInfo = in.readOptionalWriteable(BuildInfo::new);
        this.licenseInfo = in.readOptionalWriteable(LicenseInfo::new);
        this.featureSetsInfo = in.readOptionalWriteable(FeatureSetsInfo::new);
    }

    public static class LicenseInfo implements ToXContentObject, Writeable {

        private final String uid;
        private final String type;
        private final String mode;
        private final long expiryDate;
        private final License.Status status;

        public LicenseInfo(License license) {
            this(license.uid(), license.type(), license.operationMode().name().toLowerCase(Locale.ROOT),
                license.status(), license.expiryDate());
        }

        public LicenseInfo(StreamInput in) throws IOException {

```

```

        this(in.readString(), in.readString(), in.readString(), License.Status.readFrom(in), in.readLong());
    }

    public LicenseInfo(String uid, String type, String mode, License.Status status, long expiryDate) {
        this.uid = uid;
        this.type = type;
        this.mode = mode;
        this.status = status;
        this.expiryDate = expiryDate;
    }

    public String getUid() {
        return uid;
    }

    public String getType() {
        return type;
    }

    public String getMode() {
        return mode;
    }

    public long getExpiryDate() {
        return expiryDate;
    }

    public License.Status getStatus() {
        return status;
    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        builder.startObject()
            .field("uid", uid)
            .field("type", type)
            .field("mode", mode)
            .field("status", status.label());
        if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
            builder.timeField("expiry_date_in_millis", "expiry_date", expiryDate);
        }
        return builder.endObject();
    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(uid);
        out.writeString(type);
        out.writeString(mode);
    }

```

```

        status.writeTo(out);
        out.writeLong(expiryDate);
    }
}

public static class BuildInfo implements ToXContentObject, Writeable {

    private final String hash;
    private final String timestamp;

    public BuildInfo(XPackBuild build) {
        this(build.shortHash(), build.date());
    }

    public BuildInfo(StreamInput input) throws IOException {
        this(input.readString(), input.readString());
    }

    public BuildInfo(String hash, String timestamp) {
        this.hash = hash;
        this.timestamp = timestamp;
    }

    public String getHash() {
        return hash;
    }

    public String getTimestamp() {
        return timestamp;
    }

    @Override
    public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
        return builder.startObject()
            .field("hash", hash)
            .field("date", timestamp)
            .endObject();
    }

    public void writeTo(StreamOutput output) throws IOException {
        output.writeString(hash);
        output.writeString(timestamp);
    }
}

public static class FeatureSetsInfo implements ToXContentObject, Writeable {

    private final Map<String, FeatureSet> featureSets;

```



```

public FeatureSetsInfo(StreamInput in) throws IOException {
    int size = in.readVInt();
    Map<String, FeatureSet> featureSets = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        FeatureSet featureSet = new FeatureSet(in);
        featureSets.put(featureSet.name, featureSet);
    }
    this.featureSets = Collections.unmodifiableMap(featureSets);
}

public FeatureSetsInfo(Set<FeatureSet> featureSets) {
    Map<String, FeatureSet> map = new HashMap<>(featureSets.size());
    for (FeatureSet featureSet : featureSets) {
        map.put(featureSet.name, featureSet);
    }
    this.featureSets = Collections.unmodifiableMap(map);
}

public Map<String, FeatureSet> getFeatureSets() {
    return featureSets;
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    List<String> names = new
ArrayList<>(this.featureSets.keySet()).stream().sorted().collect(Collectors.toList());
    for (String name : names) {
        builder.field(name, featureSets.get(name), params);
    }
    return builder.endObject();
}

public void writeTo(StreamOutput out) throws IOException {
    out.writeVInt(featureSets.size());
    for (FeatureSet featureSet : featureSets.values()) {
        featureSet.writeTo(out);
    }
}

public static class FeatureSet implements ToXContentObject, Writeable {

    private final String name;
    @Nullable private final String description;
    private final boolean available;
    private final boolean enabled;
    @Nullable private final Map<String, Object> nativeCodeInfo;

```

```

public FeatureSet(StreamInput in) throws IOException {
    this(in.readString(), in.readOptionalString(), in.readBoolean(), in.readBoolean(),
        in.getVersion().onOrAfter(Version.V_5_4_0) ? in.readMap() : null);
}

public FeatureSet(String name, @Nullable String description, boolean available, boolean enabled,
    @Nullable Map<String, Object> nativeCodeInfo) {
    this.name = name;
    this.description = description;
    this.available = available;
    this.enabled = enabled;
    this.nativeCodeInfo = nativeCodeInfo;
}

public String name() {
    return name;
}

@Nullable
public String description() {
    return description;
}

public boolean available() {
    return available;
}

public boolean enabled() {
    return enabled;
}

@Nullable
public Map<String, Object> nativeCodeInfo() {
    return nativeCodeInfo;
}

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
    builder.startObject();
    if (description != null) {
        builder.field("description", description);
    }
    builder.field("available", available);
    builder.field("enabled", enabled);
    if (nativeCodeInfo != null) {
        builder.field("native_code_info", nativeCodeInfo);
    }
    return builder.endObject();
}

```

```

    }

    public void writeTo(StreamOutput out) throws IOException {
        out.writeString(name);
        out.writeOptionalString(description);
        out.writeBoolean(available);
        out.writeBoolean(enabled);
        if (out.getVersion().onOrAfter(Version.V_5_4_0)) {
            out.writeMap(nativeCodeInfo);
        }
    }
}

}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartBasicAction extends Action<PostStartBasicRequest, PostStartBasicResponse,
PostStartBasicRequestBuilder> {

    public static final PostStartBasicAction INSTANCE = new PostStartBasicAction();
    public static final String NAME = "cluster:admin/xpack/license/start_basic";

    private PostStartBasicAction() {
        super(NAME);
    }

    @Override
    public PostStartBasicRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartBasicRequestBuilder(client, this);
    }

    @Override
    public PostStartBasicResponse newResponse() {
        return new PostStartBasicResponse();
    }
}
}
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```

```

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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetBasicStatusRequestBuilder extends ActionRequestBuilder<GetBasicStatusRequest,
GetBasicStatusResponse,
    GetBasicStatusRequestBuilder> {

    GetBasicStatusRequestBuilder(ElasticsearchClient client, GetBasicStatusAction action) {
        super(client, action, new GetBasicStatusRequest());
    }
}
/*
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* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartTrialRequest extends MasterNodeRequest<PostStartTrialRequest> {

    private boolean acknowledge = false;
    private String type;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    public PostStartTrialRequest setType(String type) {
        this.type = type;
        return this;
    }

    public String getType() {
        return type;
    }
}

```

```

public PostStartTrialRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean isAcknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
        type = in.readString();
        acknowledge = in.readBoolean();
    } else {
        type = "trial";
        acknowledge = true;
    }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    Version version = Version.V_6_3_0;
    if (out.getVersion().onOrAfter(version)) {
        super.writeTo(out);
        out.writeString(type);
        out.writeBoolean(acknowledge);
    } else {
        if ("trial".equals(type) == false) {
            throw new IllegalArgumentException("All nodes in cluster must be version [" + version
                + "] or newer to start trial with a different type than 'trial'. Attempting to write to " +
                "a node with version [" + out.getVersion() + "] with trial type [" + type + "].");
        } else if (acknowledge == false) {
            throw new IllegalArgumentException("Request must be acknowledged to send to a node with a version " +
                "prior to [" + version + "]. Attempting to send request to node with version [" + out.getVersion() + "] "
                +
                "without acknowledgement.");
        } else {
            super.writeTo(out);
        }
    }
}
}
}
/*
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* or more contributor license agreements. Licensed under the Elastic License;

```

```

* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetTrialStatusAction extends TransportMasterNodeReadAction<GetTrialStatusRequest,
GetTrialStatusResponse> {

    @Inject
    public TransportGetTrialStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,

        ThreadPool threadPool, ActionFilters actionFilters,
        IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, GetTrialStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
            indexNameExpressionResolver, GetTrialStatusRequest::new);
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.SAME;
    }

    @Override
    protected GetTrialStatusResponse newResponse() {
        return new GetTrialStatusResponse();
    }

    @Override
    protected void masterOperation(GetTrialStatusRequest request, ClusterState state,
        ActionListener<GetTrialStatusResponse> listener) throws Exception {
        LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
        listener.onResponse(new GetTrialStatusResponse(licensesMetaData == null ||
licensesMetaData.isEligibleForTrial()));
    }

}

```

```

@Override
protected ClusterBlockException checkBlock(GetTrialStatusRequest request, ClusterState state) {
    return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.AckedClusterStateUpdateTask;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.AbstractLifecycleComponent;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.env.Environment;
import org.elasticsearch.gateway.GatewayService;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.time.Clock;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Locale;
import java.util.Map;

```

```

import java.util.Set;
import java.util.concurrent.atomic.AtomicReference;

/**
 * Service responsible for managing { @link LicensesMetaData}.
 * <p>
 * On the master node, the service handles updating the cluster state when a new license is registered.
 * It also listens on all nodes for cluster state updates, and updates { @link XPackLicenseState} when
 * the license changes are detected in the cluster state.
 */
public class LicenseService extends AbstractLifecycleComponent implements ClusterStateListener,
SchedulerEngine.Listener {

    public static final Setting<String> SELF_GENERATED_LICENSE_TYPE = new
Setting<>("xpack.license.self_generated.type",
        (s) -> "basic", (s) -> {
            if (SelfGeneratedLicense.validSelfGeneratedType(s)) {
                return s;
            } else {
                throw new IllegalArgumentException("Illegal self generated license type [" + s + "]. Must be trial or basic.");
            }
        }, Setting.Property.NodeScope);

    // pkg private for tests
    static final TimeValue NON_BASIC_SELF_GENERATED_LICENSE_DURATION =
TimeValue.timeValueHours(30 * 24);

    static final Set<String> VALID_TRIAL_TYPES = new HashSet<>(Arrays.asList("trial", "platinum", "gold"));

    /**
     * Duration of grace period after a license has expired
     */
    static final TimeValue GRACE_PERIOD_DURATION = days(7);

    public static final long BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS =
Long.MAX_VALUE - days(365).millis();

    private final ClusterService clusterService;

    /**
     * The xpack feature state to update when license changes are made.
     */
    private final XPackLicenseState licenseState;

    /**
     * Currently active license
     */
    private final AtomicReference<License> currentLicense = new AtomicReference<>();

```



```

private SchedulerEngine scheduler;
private final Clock clock;

/**
 * File watcher for operation mode changes
 */
private final OperationModeFileWatcher operationModeFileWatcher;

/**
 * Callbacks to notify relative to license expiry
 */
private List<ExpirationCallback> expirationCallbacks = new ArrayList<>();

/**
 * Max number of nodes licensed by generated trial license
 */
static final int SELF_GENERATED_LICENSE_MAX_NODES = 1000;

public static final String LICENSE_JOB = "licenseJob";

private static final FormatDateTimeFormatter DATE_FORMATTER = Joda.forPattern("EEEE, MMMMM dd,
yyyy", Locale.ROOT);

private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
To acknowledge the license, " +
    "please read the following messages and update the license again, this time with the \"acknowledge=true\"
parameter:";

public LicenseService(Settings settings, ClusterService clusterService, Clock clock, Environment env,
    ResourceWatcherService resourceWatcherService, XPackLicenseState licenseState) {
    super(settings);
    this.clusterService = clusterService;
    this.clock = clock;
    this.scheduler = new SchedulerEngine(clock);
    this.licenseState = licenseState;
    this.operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService,
        XPackPlugin.resolveConfigFile(env, "license_mode"), logger,
        () -> updateLicenseState(getLicensesMetaData()));
    this.scheduler.register(this);
    populateExpirationCallbacks();
}

private void logExpirationWarning(long expirationMillis, boolean expired) {
    String expiredMsg = expired ? "expired" : "will expire";
    String general = LoggerMessageFormat.format(null, "License [{}] on [{}].\n" +
        "# If you have a new license, please update it. Otherwise, please reach out to\n" +
        "# your support contact.\n" +
        "# ", expiredMsg, DATE_FORMATTER.printer().print(expirationMillis));
}

```

```

if (expired) {
    general = general.toUpperCase(Locale.ROOT);
}
StringBuilder builder = new StringBuilder(general);
builder.append(System.lineSeparator());
if (expired) {
    builder.append("# COMMERCIAL PLUGINS OPERATING WITH REDUCED FUNCTIONALITY");
} else {
    builder.append("# Commercial plugins operate with reduced functionality on license expiration:");
}
XPackLicenseState.EXPIRATION_MESSAGES.forEach((feature, messages) -> {
    if (messages.length > 0) {
        builder.append(System.lineSeparator());
        builder.append("# - ");
        builder.append(feature);
        for (String message : messages) {
            builder.append(System.lineSeparator());
            builder.append("# - ");
            builder.append(message);
        }
    }
});
logger.warn("{} ", builder);
}

private void populateExpirationCallbacks() {
    expirationCallbacks.add(new ExpirationCallback.Pre(days(7), days(25), days(1)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Pre(days(0), days(7), TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            logExpirationWarning(license.expiryDate(), false);
        }
    });
    expirationCallbacks.add(new ExpirationCallback.Post(days(0), null, TimeValue.timeValueMinutes(10)) {
        @Override
        public void on(License license) {
            // logged when grace period begins
            logExpirationWarning(license.expiryDate(), true);
        }
    });
}

/**

```

```

* Registers new license in the cluster
* Master only operation. Installs a new license on the master provided it is VALID
*/
public void registerLicense(final PutLicenseRequest request, final ActionListener<PutLicenseResponse> listener)
{
    final License newLicense = request.license();
    final long now = clock.millis();
    if (!LicenseVerifier.verifyLicense(newLicense) || newLicense.issueDate() > now || newLicense.startDate() >
now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.INVALID));
    } else if (newLicense.type().equals("basic")) {
        listener.onFailure(new IllegalArgumentException("Registering basic licenses is not allowed."));
    } else if (newLicense.expiryDate() < now) {
        listener.onResponse(new PutLicenseResponse(true, LicensesStatus.EXPIRED));
    } else {
        if (!request.acknowledged()) {
            // TODO: ack messages should be generated on the master, since another node's cluster state may be
behind...
            final License currentLicense = getLicense();
            if (currentLicense != null) {
                Map<String, String[]> acknowledgeMessages = getAckMessages(newLicense, currentLicense);
                if (acknowledgeMessages.isEmpty() == false) {
                    // needs acknowledgement
                    listener.onResponse(new PutLicenseResponse(false, LicensesStatus.VALID,
ACKNOWLEDGEMENT_HEADER,
                    acknowledgeMessages));
                }
            }
        }

        if (newLicense.isProductionLicense()
            && XPackSettings.SECURITY_ENABLED.get(settings)
            && XPackSettings.TRANSPORT_SSL_ENABLED.get(settings) == false
            && isProductionMode(settings, clusterService.localNode())) {
            // security is on but TLS is not configured we gonna fail the entire request and throw an exception
            throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
                "] license unless TLS is configured or security is disabled");
            // TODO we should really validate that all nodes have xpack installed and are consistently configured but
this
            // should happen on a different level and not in this code
        } else {
            clusterService.submitStateUpdateTask("register license [" + newLicense.uid() + "]", new
                AckedClusterStateUpdateTask<PutLicenseResponse>(request, listener) {
                @Override
                protected PutLicenseResponse newResponse(boolean acknowledged) {
                    return new PutLicenseResponse(acknowledged, LicensesStatus.VALID);
                }
            }
        }
    }
}

```

```

@Override
public ClusterState execute(ClusterState currentState) throws Exception {
    XPackPlugin.checkReadyForXPackCustomMetadadata(currentState);
    MetaData currentMetadadata = currentState.metaData();
    LicensesMetaData licensesMetadadata = currentMetadadata.custom(LicensesMetaData.TYPE);
    Version trialVersion = null;
    if (licensesMetadadata != null) {
        trialVersion = licensesMetadadata.getMostRecentTrialVersion();
    }
    MetaData.Builder mdBuilder = MetaData.builder(currentMetadadata);
    mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(newLicense,
trialVersion));
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}
});
}
}
}

```

```

public static Map<String, String[]> getAckMessages(License newLicense, License currentLicense) {
    Map<String, String[]> acknowledgeMessages = new HashMap<>();
    if (!License.isAutoGeneratedLicense(currentLicense.signature()) // current license is not auto-generated
        && currentLicense.issueDate() > newLicense.issueDate()) { // and has a later issue date
        acknowledgeMessages.put("license", new String[]{
            "The new license is older than the currently installed license. " +
            "Are you sure you want to override the current license?" });
    }
    XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.forEach((feature, ackMessages) -> {
        String[] messages = ackMessages.apply(currentLicense.operationMode(), newLicense.operationMode());
        if (messages.length > 0) {
            acknowledgeMessages.put(feature, messages);
        }
    });
    return acknowledgeMessages;
}

```

```

private static TimeValue days(int days) {
    return TimeValue.timeValueHours(days * 24);
}

```

```

@Override
public void triggered(SchedulerEngine.Event event) {
    final LicensesMetaData licensesMetadadata = getLicensesMetadadata();
    if (licensesMetadadata != null) {
        final License license = licensesMetadadata.getLicense();
        if (event.getJobName().equals(LICENSE_JOB)) {

```

```

        updateLicenseState(license, licensesMetaData.getMostRecentTrialVersion());
    } else if (event.getJobName().startsWith(ExpirationCallback.EXPIRATION_JOB_PREFIX)) {
        expirationCallbacks.stream()
            .filter(expirationCallback -> expirationCallback.getId().equals(event.getJobName()))
            .forEach(expirationCallback -> expirationCallback.on(license));
    }
}
}

/**
 * Remove license from the cluster state metadata
 */
public void removeLicense(final DeleteLicenseRequest request, final
ActionListener<ClusterStateUpdateResponse> listener) {
    clusterService.submitStateUpdateTask("delete license",
        new AckedClusterStateUpdateTask<ClusterStateUpdateResponse>(request, listener) {
            @Override
            protected ClusterStateUpdateResponse newResponse(boolean acknowledged) {
                return new ClusterStateUpdateResponse(acknowledged);
            }

            @Override
            public ClusterState execute(ClusterState currentState) throws Exception {
                Metadata metaData = currentState.metaData();
                final LicensesMetaData currentLicenses = metaData.custom(LicensesMetaData.TYPE);
                if (currentLicenses.getLicense() != LicensesMetaData.LICENSE_TOMBSTONE) {
                    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
                    LicensesMetaData newMetadata = new
LicensesMetaData(LicensesMetaData.LICENSE_TOMBSTONE,
                        currentLicenses.getMostRecentTrialVersion());
                    mdBuilder.putCustom(LicensesMetaData.TYPE, newMetadata);
                    return ClusterState.builder(currentState).metaData(mdBuilder).build();
                } else {
                    return currentState;
                }
            }
        });
}

public License getLicense() {
    final License license = getLicense(clusterService.state().metaData());
    return license == LicensesMetaData.LICENSE_TOMBSTONE ? null : license;
}

private LicensesMetaData getLicensesMetaData() {
    return this.clusterService.state().metaData().custom(LicensesMetaData.TYPE);
}

```

```

void startTrialLicense(PostStartTrialRequest request, final ActionListener<PostStartTrialResponse> listener) {
    if (VALID_TRIAL_TYPES.contains(request.getType()) == false) {
        throw new IllegalArgumentException("Cannot start trial of type [" + request.getType() + "]. Valid trial types
are "
            + VALID_TRIAL_TYPES + ".");
    }
    StartTrialClusterTask task = new StartTrialClusterTask(logger, clusterService.getClusterName().value(), clock,
request, listener);
    clusterService.submitStateUpdateTask("started trial license", task);
}

void startBasicLicense(PostStartBasicRequest request, final ActionListener<PostStartBasicResponse> listener) {
    StartBasicClusterTask task = new StartBasicClusterTask(logger, clusterService.getClusterName().value(),
clock, request, listener);
    clusterService.submitStateUpdateTask("start basic license", task);
}

/**
 * Master-only operation to generate a one-time global self generated license.
 * The self generated license is only generated and stored if the current cluster state metadata
 * has no existing license. If the cluster currently has a basic license that has an expiration date,
 * a new basic license with no expiration date is generated.
 */
private void registerOrUpdateSelfGeneratedLicense() {
    clusterService.submitStateUpdateTask("maybe generate license for cluster",
        new StartupSelfGeneratedLicenseTask(settings, clock, clusterService));
}

@Override
protected void doStart() throws ElasticsearchException {
    clusterService.addListener(this);
    scheduler.start(Collections.emptyList());
    logger.debug("initializing license state");
    if (clusterService.lifecycleState() == Lifecycle.State.STARTED) {
        final ClusterState clusterState = clusterService.state();
        if (clusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK) == false
&&
            clusterState.nodes().getMasterNode() != null &&
XPackPlugin.isReadyForXPackCustomMetadata(clusterState)) {
            final LicensesMetaData currentMetaData = clusterState.metaData().custom(LicensesMetaData.TYPE);
            boolean noLicense = currentMetaData == null || currentMetaData.getLicense() == null;
            if (clusterState.getNodes().isLocalNodeElectedMaster() &&
                (noLicense || LicenseUtils.licenseNeedsExtended(currentMetaData.getLicense()))) {
                // triggers a cluster changed event eventually notifying the current licensee
                registerOrUpdateSelfGeneratedLicense();
            }
        }
    }
}

```

```

}

@Override
protected void doStop() throws ElasticsearchException {
    clusterService.removeListener(this);
    scheduler.stop();
    // clear current license
    currentLicense.set(null);
}

@Override
protected void doClose() throws ElasticsearchException {
}

/**
 * When there is no global block on {@link
org.elasticsearch.gateway.GatewayService#STATE_NOT_RECOVERED_BLOCK}
 * notify licensees and issue auto-generated license if no license has been installed/issued yet.
 */
@Override
public void clusterChanged(ClusterChangedEvent event) {
    final ClusterState previousClusterState = event.previousState();
    final ClusterState currentClusterState = event.state();
    if (!currentClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)) {
        if (XPackPlugin.isReadyForXPackCustomMetadata(currentClusterState) == false) {
            logger.debug("cannot add license to cluster as the following nodes might not understand the license
metadata: {}",
                () -> XPackPlugin.nodesNotReadyForXPackCustomMetadata(currentClusterState));
            return;
        }

        final LicensesMetaData prevLicensesMetaData =
previousClusterState.getMetaData().custom(LicensesMetaData.TYPE);
        final LicensesMetaData currentLicensesMetaData =
currentClusterState.getMetaData().custom(LicensesMetaData.TYPE);
        if (logger.isDebugEnabled()) {
            logger.debug("previous [{}]", prevLicensesMetaData);
            logger.debug("current [{}]", currentLicensesMetaData);
        }
        // notify all interested plugins
        if (previousClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)
            || prevLicensesMetaData == null) {
            if (currentLicensesMetaData != null) {
                onUpdate(currentLicensesMetaData);
            }
        } else if (!prevLicensesMetaData.equals(currentLicensesMetaData)) {
            onUpdate(currentLicensesMetaData);
        }
    }
}

```

```

License currentLicense = null;
boolean noLicenseInPrevMetadata = prevLicensesMetaData == null || prevLicensesMetaData.getLicense()
== null;
    if (noLicenseInPrevMetadata == false) {
        currentLicense = prevLicensesMetaData.getLicense();
    }
    boolean noLicenseInCurrentMetadata = (currentLicensesMetaData == null ||
currentLicensesMetaData.getLicense() == null);
    if (noLicenseInCurrentMetadata == false) {
        currentLicense = currentLicensesMetaData.getLicense();
    }

    boolean noLicense = noLicenseInPrevMetadata && noLicenseInCurrentMetadata;
    // auto-generate license if no licenses ever existed or if the current license is basic and
    // needs extended. this will trigger a subsequent cluster changed event
    if (currentClusterState.getNodes().isLocalNodeElectedMaster()
        && (noLicense || LicenseUtils.licenseNeedsExtended(currentLicense))) {
        registerOrUpdateSelfGeneratedLicense();
    }
} else if (logger.isDebugEnabled()) {
    logger.debug("skipped license notifications reason: [{}]",
GatewayService.STATE_NOT_RECOVERED_BLOCK);
}
}

private void updateLicenseState(LicensesMetaData licensesMetaData) {
    if (licensesMetaData != null) {
        updateLicenseState(getLicense(licensesMetaData), licensesMetaData.getMostRecentTrialVersion());
    }
}

protected void updateLicenseState(final License license, Version mostRecentTrialVersion) {
    if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
        // implies license has been explicitly deleted
        licenseState.update(License.OperationMode.MISSING, false, mostRecentTrialVersion);
        return;
    }
    if (license != null) {
        long time = clock.millis();
        boolean active;
        if (license.expiryDate() == BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
            active = true;
        } else {
            // We subtract the grace period from the current time to avoid overflowing on an expiration
            // date that is near Long.MAX_VALUE
            active = time >= license.issueDate() && time - GRACE_PERIOD_DURATION.getMillis() <
license.expiryDate();

```



```

    }
    licenseState.update(license.operationMode(), active, mostRecentTrialVersion);

    if (active) {
        if (time < license.expiryDate()) {
            logger.debug("license [{}] - valid", license.uid());
        } else {
            logger.warn("license [{}] - grace", license.uid());
        }
    } else {
        logger.warn("license [{}] - expired", license.uid());
    }
}

/**
 * Notifies registered licensees of license state change and/or new active license
 * based on the license in <code>currentLicensesMetaData</code>.
 * Additionally schedules license expiry notifications and event callbacks
 * relative to the current license's expiry
 */
private void onUpdate(final LicensesMetaData currentLicensesMetaData) {
    final License license = getLicense(currentLicensesMetaData);
    // license can be null if the trial license is yet to be auto-generated
    // in this case, it is a no-op
    if (license != null) {
        final License previousLicense = currentLicense.get();
        if (license.equals(previousLicense) == false) {
            currentLicense.set(license);
            license.setOperationModeFileWatcher(operationModeFileWatcher);
            scheduler.add(new SchedulerEngine.Job(LICENSE_JOB, nextLicenseCheck(license)));
            for (ExpirationCallback expirationCallback : expirationCallbacks) {
                scheduler.add(new SchedulerEngine.Job(expirationCallback.getId(),
                    (startTime, now) ->
                        expirationCallback.nextScheduledTimeForExpiry(license.expiryDate(), startTime, now)));
            }
            if (previousLicense != null) {
                // remove operationModeFileWatcher to gc the old license object
                previousLicense.removeOperationModeFileWatcher();
            }
            logger.info("license [{}] mode [{}] - valid", license.uid(),
                license.operationMode().name().toLowerCase(Locale.ROOT));
        }
        updateLicenseState(license, currentLicensesMetaData.getMostRecentTrialVersion());
    }
}

// pkg private for tests

```

```

static SchedulerEngine.Schedule nextLicenseCheck(License license) {
    return (startTime, time) -> {
        if (time < license.issueDate()) {
            // when we encounter a license with a future issue date
            // which can happen with autogenerated license,
            // we want to schedule a notification on the license issue date
            // so the license is notified once it is valid
            // see https://github.com/elastic/x-plugins/issues/983
            return license.issueDate();
        } else if (time < license.expiryDate()) {
            return license.expiryDate();
        } else if (time < license.expiryDate() + GRACE_PERIOD_DURATION.getMillis()) {
            return license.expiryDate() + GRACE_PERIOD_DURATION.getMillis();
        }
        return -1; // license is expired, no need to check again
    };
}

public static License getLicense(final MetaData metaData) {
    final LicensesMetaData licensesMetaData = metaData.custom(LicensesMetaData.TYPE);
    return getLicense(licensesMetaData);
}

static License getLicense(final LicensesMetaData metaData) {
    if (metaData != null) {
        License license = metaData.getLicense();
        if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
            return license;
        } else if (license != null) {
            boolean autoGeneratedLicense = License.isAutoGeneratedLicense(license.signature());
            if ((autoGeneratedLicense && SelfGeneratedLicense.verify(license))
                || (!autoGeneratedLicense && LicenseVerifier.verifyLicense(license))) {
                return license;
            }
        }
    }
    return null;
}

private static boolean isProductionMode(Settings settings, DiscoveryNode localNode) {
    final boolean singleNodeDisco = "single-
node".equals(DiscoveryModule.DISCOVERY_TYPE_SETTING.get(settings));
    return singleNodeDisco == false && isBoundToLoopback(localNode) == false;
}

private static boolean isBoundToLoopback(DiscoveryNode localNode) {
    return localNode.getAddress().address().isLoopbackAddress();
}

```

```

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartTrialAction extends Action<PostStartTrialRequest, PostStartTrialResponse,
PostStartTrialRequestBuilder> {

    public static final PostStartTrialAction INSTANCE = new PostStartTrialAction();
    public static final String NAME = "cluster:admin/xpack/license/start_trial";

    private PostStartTrialAction() {
        super(NAME);
    }

    @Override
    public PostStartTrialRequestBuilder newRequestBuilder(ElasticsearchClient client) {
        return new PostStartTrialRequestBuilder(client, this);
    }

    @Override
    public PostStartTrialResponse newResponse() {
        return new PostStartTrialResponse();
    }
}
/*
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.rest.action.RestBuilderListener;

public class LicensingClient {

    private final ElasticsearchClient client;

    public LicensingClient(ElasticsearchClient client) {
        this.client = client;
    }
}

```

```

}

public PutLicenseRequestBuilder preparePutLicense(License license) {
    return new PutLicenseRequestBuilder(client).setLicense(license);
}

public void putLicense(PutLicenseRequest request, ActionListener<PutLicenseResponse> listener) {
    client.execute(PutLicenseAction.INSTANCE, request, listener);
}

public GetLicenseRequestBuilder prepareGetLicense() {
    return new GetLicenseRequestBuilder(client);
}

public void getLicense(GetLicenseRequest request, ActionListener<GetLicenseResponse> listener) {
    client.execute(GetLicenseAction.INSTANCE, request, listener);
}

public DeleteLicenseRequestBuilder prepareDeleteLicense() {
    return new DeleteLicenseRequestBuilder(client);
}

public void deleteLicense(DeleteLicenseRequest request, ActionListener<DeleteLicenseResponse> listener) {
    client.execute(DeleteLicenseAction.INSTANCE, request, listener);
}

public PostStartTrialRequestBuilder preparePostStartTrial() {
    return new PostStartTrialRequestBuilder(client, PostStartTrialAction.INSTANCE);
}

public GetTrialStatusRequestBuilder prepareGetStartTrial() {
    return new GetTrialStatusRequestBuilder(client, GetTrialStatusAction.INSTANCE);
}

public void postStartTrial(PostStartTrialRequest request, ActionListener<PostStartTrialResponse> listener) {
    client.execute(PostStartTrialAction.INSTANCE, request, listener);
}

public void postStartBasic(PostStartBasicRequest request, ActionListener<PostStartBasicResponse> listener) {
    client.execute(PostStartBasicAction.INSTANCE, request, listener);
}

public PostStartBasicRequestBuilder preparePostStartBasic() {
    return new PostStartBasicRequestBuilder(client, PostStartBasicAction.INSTANCE);
}

public GetBasicStatusRequestBuilder prepareGetStartBasic() {
    return new GetBasicStatusRequestBuilder(client, GetBasicStatusAction.INSTANCE);
}

```

```

    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetBasicStatus extends XPackRestHandler {

    RestGetBasicStatus(Settings settings, RestController controller) {
        super(settings);
        controller.registerHandler(GET, URI_BASE + "/license/basic_status", this);
    }

    @Override
    protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
    {
        return channel -> client.licensing().prepareGetStartBasic().execute(
            new RestBuilderListener<GetBasicStatusResponse>(channel) {
                @Override
                public RestResponse buildResponse(GetBasicStatusResponse response, XContentBuilder builder)
                throws Exception {
                    builder.startObject();
                    builder.field("eligible_to_start_basic", response.isEligibleToStartBasic());
                    builder.endObject();
                    return new BytesRestResponse(RestStatus.OK, builder);
                }
            });
    }

    @Override

```

```

    public String getName() {
        return "xpack_basic_status_action";
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseRequest extends AcknowledgedRequest<DeleteLicenseRequest> {

    public DeleteLicenseRequest() {
    }

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }

    @Override
    public void readFrom(StreamInput in) throws IOException {
        super.readFrom(in);
    }

    @Override
    public void writeTo(StreamOutput out) throws IOException {
        super.writeTo(out);
    }
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;

```

```

import org.apache.logging.log4j.util.Supplier;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.UUID;

public class StartupSelfGeneratedLicenseTask extends ClusterStateUpdateTask {

    /**
     * Max number of nodes licensed by generated trial license
     */
    private int selfGeneratedLicenseMaxNodes = 1000;

    private final Settings settings;
    private final Clock clock;
    private final ClusterService clusterService;
    private final Logger logger;

    public StartupSelfGeneratedLicenseTask(Settings settings, Clock clock, ClusterService clusterService) {
        this.settings = settings;
        this.clock = clock;
        this.clusterService = clusterService;
        this.logger = Loggers.getLogger(getClass(), settings);
    }

    @Override
    public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
        LicensesMetaData licensesMetaData = newState.metaData().custom(LicensesMetaData.TYPE);
        if (logger.isDebugEnabled()) {
            logger.debug("registered self generated license: {}", licensesMetaData);
        }
    }

    @Override
    public ClusterState execute(ClusterState currentState) throws Exception {
        XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
        final MetaData metaData = currentState.metaData();
        final LicensesMetaData currentLicensesMetaData = metaData.custom(LicensesMetaData.TYPE);
        // do not generate a license if any license is present
        if (currentLicensesMetaData == null) {

```

```

String type = LicenseService.SELF_GENERATED_LICENSE_TYPE.get(settings);
if (SelfGeneratedLicense.validSelfGeneratedType(type) == false) {
    throw new IllegalArgumentException("Illegal self generated license type [" + type +
        "]. Must be trial or basic.");
}

return updateWithLicense(currentState, type);
} else if (LicenseUtils.licenseNeedsExtended(currentLicensesMetaData.getLicense())) {
    return extendBasic(currentState, currentLicensesMetaData);
} else {
    return currentState;
}
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error((Supplier<?>) () -> new ParameterizedMessage("unexpected failure during [{}]", source), e);
}

private ClusterState extendBasic(ClusterState currentState, LicensesMetaData currentLicenseMetadata) {
    License license = currentLicenseMetadata.getLicense();
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    LicensesMetaData newLicenseMetadata = createBasicLicenseFromExistingLicense(currentLicenseMetadata);
    mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
    logger.info("Existing basic license has an expiration. Basic licenses no longer expire." +
        "Regenerating license.\n\nOld license:\n {} \n\n New license:\n {}", license,
newLicenseMetadata.getLicense());
    return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

private LicensesMetaData createBasicLicenseFromExistingLicense(LicensesMetaData currentLicenseMetadata) {
    License currentLicense = currentLicenseMetadata.getLicense();
    License.Builder specBuilder = License.builder()
        .uid(currentLicense.uid())
        .issuedTo(currentLicense.issuedTo())
        .maxNodes(selfGeneratedLicenseMaxNodes)
        .issueDate(currentLicense.issueDate())
        .type("basic")
        .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
    License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
    Version trialVersion = currentLicenseMetadata.getMostRecentTrialVersion();
    return new LicensesMetaData(selfGeneratedLicense, trialVersion);
}

private ClusterState updateWithLicense(ClusterState currentState, String type) {
    long issueDate = clock.millis();
    Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
    long expiryDate;

```



```

        if ("basic".equals(type)) {
            expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
        } else {
            expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
        }
        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterService.getClusterName().value())
            .maxNodes(selfGeneratedLicenseMaxNodes)
            .issueDate(issueDate)
            .type(type)
            .expiryDate(expiryDate);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        LicensesMetaData licensesMetaData;
        if ("trial".equals(type)) {
            licensesMetaData = new LicensesMetaData(selfGeneratedLicense, Version.CURRENT);
        } else {
            licensesMetaData = new LicensesMetaData(selfGeneratedLicense, null);
        }
        mdBuilder.putCustom(LicensesMetaData.TYPE, licensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.license.PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT;

class PostStartBasicResponse extends AcknowledgedResponse {

    private Map<String, String[]> acknowledgeMessages;
    private String acknowledgeMessage;

```

```

enum Status {
    GENERATED_BASIC(true, null, RestStatus.OK),
    ALREADY_USING_BASIC(false, "Operation failed: Current license is basic.", RestStatus.FORBIDDEN),
    NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

    private final boolean isBasicStarted;
    private final String errorMessage;
    private final RestStatus restStatus;

    Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
        this.isBasicStarted = isBasicStarted;
        this.errorMessage = errorMessage;
        this.restStatus = restStatus;
    }

    boolean isBasicStarted() {
        return isBasicStarted;
    }

    String getErrorMessage() {
        return errorMessage;
    }

    RestStatus getRestStatus() {
        return restStatus;
    }
}

private Status status;

PostStartBasicResponse() {
}

PostStartBasicResponse(Status status) {
    this(status, Collections.emptyMap(), null);
}

PostStartBasicResponse(Status status, Map<String, String[]> acknowledgeMessages, String
acknowledgeMessage) {
    super(status != NEED_ACKNOWLEDGEMENT);
    this.status = status;
    this.acknowledgeMessages = acknowledgeMessages;
    this.acknowledgeMessage = acknowledgeMessage;
}

public Status getStatus() {
    return status;
}

```

```

}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    readAcknowledged(in);
    status = in.readEnum(Status.class);
    acknowledgeMessage = in.readOptionalString();
    int size = in.readVInt();
    Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
    for (int i = 0; i < size; i++) {
        String feature = in.readString();
        int nMessages = in.readVInt();
        String[] messages = new String[nMessages];
        for (int j = 0; j < nMessages; j++) {
            messages[j] = in.readString();
        }
        acknowledgeMessages.put(feature, messages);
    }
    this.acknowledgeMessages = acknowledgeMessages;
}

```

```

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    writeAcknowledged(out);
    out.writeEnum(status);
    out.writeOptionalString(acknowledgeMessage);
    out.writeVInt(acknowledgeMessages.size());
    for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
        out.writeString(entry.getKey());
        out.writeVInt(entry.getValue().length);
        for (String message : entry.getValue()) {
            out.writeString(message);
        }
    }
}

```

```

@Override
protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
    if (status.isBasicStarted()) {
        builder.field("basic_was_started", true);
    } else {
        builder.field("basic_was_started", false);
        builder.field("error_message", status.getErrorMessage());
    }
    if (acknowledgeMessages.isEmpty() == false) {
        builder.startObject("acknowledge");
    }
}

```

```

        builder.field("message", acknowledgeMessage);
        for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
            builder.startArray(entry.getKey());
            for (String message : entry.getValue()) {
                builder.value(message);
            }
            builder.endArray();
        }
        builder.endObject();
    }
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.joda.time.MutableDateTime;
import org.joda.time.format.DateTimeFormatter;
import org.joda.time.format.ISODateTimeFormat;

public class DateUtils {

    private static final FormatDateTimeFormatter formatDateOnlyFormatter = Joda.forPattern("yyyy-MM-dd");

    private static final DateTimeFormatter dateOnlyFormatter = formatDateOnlyFormatter.parser().withZoneUTC();

    private static final DateTimeFormatter dateTimeFormatter = ISODateTimeFormat.dateTime().withZoneUTC();

    public static long endOfDay(String date) {
        try {
            // Try parsing using complete date/time format
            return dateTimeFormatter.parseDateTime(date).getMillis();
        } catch (IllegalArgumentException ex) {
            // Fall back to the date only format
            MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
            dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
            return dateTime.getMillis();
        }
    }

    public static long beginningOfDay(String date) {
        try {
            // Try parsing using complete date/time format

```

```

        return dateTimeFormatter.parseDateTime(date).getMillis();
    } catch (IllegalArgumentException ex) {
        // Fall back to the date only format
        return dateOnlyFormatter.parseDateTime(date).getMillis();
    }
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseRequestBuilder extends AcknowledgedRequestBuilder<DeleteLicenseRequest,
DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

    public DeleteLicenseRequestBuilder(ElasticsearchClient client) {
        this(client, DeleteLicenseAction.INSTANCE);
    }

    /**
     * Creates new get licenses request builder
     *
     * @param client elasticsearch client
     */
    public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
        super(client, action, new DeleteLicenseRequest());
    }
}
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 */
package org.elasticsearch.license;

public enum LicensesStatus {
    VALID((byte) 0),
    INVALID((byte) 1),
    EXPIRED((byte) 2);

    private final byte id;

```

```

LicensesStatus(byte id) {
    this.id = id;
}

public int id() {
    return id;
}

public static LicensesStatus fromId(int id) {
    if (id == 0) {
        return VALID;
    } else if (id == 1) {
        return INVALID;
    } else if (id == 2) {
        return EXPIRED;
    } else {
        throw new IllegalStateException("no valid LicensesStatus for id=" + id);
    }
}
}
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 */

/**
 * Licensing for xpack.
 *
 * A {@link org.elasticsearch.license.License} is a signed set of json properties that determine what features
 * are available in a running cluster. Licenses are registered through a
 * {@link org.elasticsearch.license.PutLicenseRequest}. This action is handled by the master node, which places
 * the signed license into the cluster state. Each node listens for cluster state updates via the
 * {@link org.elasticsearch.license.LicenseService}, and updates its local copy of the license when it detects
 * changes in the cluster state.
 *
 * The logic for which features are available given the current license is handled by
 * {@link org.elasticsearch.license.XPackLicenseState}, which is updated by the
 * {@link org.elasticsearch.license.LicenseService} when the license changes.
 */
package org.elasticsearch.license;
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPutLicenseAction extends TransportMasterNodeAction<PutLicenseRequest,
PutLicenseResponse> {

    private final LicenseService licenseService;

    @Inject
    public TransportPutLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
                                LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
                                IndexNameExpressionResolver indexNameExpressionResolver) {
        super(settings, PutLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
            PutLicenseRequest::new);
        this.licenseService = licenseService;
    }

    @Override
    protected String executor() {
        return ThreadPool.Names.MANAGEMENT;
    }

    @Override
    protected PutLicenseResponse newResponse() {
        return new PutLicenseResponse();
    }

    @Override
    protected ClusterBlockException checkBlock(PutLicenseRequest request, ClusterState state) {
        return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
    }

    @Override
    protected void masterOperation(final PutLicenseRequest request, ClusterState state, final

```

```

ActionListener<PutLicenseResponse>
    listener) throws ElasticsearchException {
    licenseService.registerLicense(request, listener);
}

}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartBasicRequestBuilder extends ActionRequestBuilder<PostStartBasicRequest,
    PostStartBasicResponse, PostStartBasicRequestBuilder> {

    PostStartBasicRequestBuilder(ElasticsearchClient client, PostStartBasicAction action) {
        super(client, action, new PostStartBasicRequest());
    }

    public PostStartBasicRequestBuilder setAcknowledge(boolean acknowledge) {
        request.acknowledge(acknowledge);
        return this;
    }
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetTrialStatusResponse extends ActionResponse {

    private boolean eligibleToStartTrial;

    GetTrialStatusResponse() {
    }
}

```



```

GetTrialStatusResponse(boolean eligibleToStartTrial) {
    this.eligibleToStartTrial = eligibleToStartTrial;
}

boolean isEligibleToStartTrial() {
    return eligibleToStartTrial;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    eligibleToStartTrial = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    out.writeBoolean(eligibleToStartTrial);
}
}
/*
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicBoolean;
import java.util.concurrent.atomic.AtomicReference;

public class StartTrialClusterTask extends ClusterStateUpdateTask {

    private static final String ACKNOWLEDGEMENT_HEADER = "This API initiates a free 30-day trial for all
    platinum features. " +
        "By starting this trial, you agree that it is subject to the terms and conditions at" +

```

```
" https://www.elastic.co/legal/trial_license/. To begin your free trial, call /start_trial again and specify " +  
"the \"acknowledge=true\" parameter.";
```

```
private static final Map<String, String[]> ACK_MESSAGES = Collections.singletonMap("security",  
    new String[] { "With a trial license, X-Pack security features are available, but are not enabled by default." });
```

```
private final Logger logger;  
private final String clusterName;  
private final PostStartTrialRequest request;  
private final ActionListener<PostStartTrialResponse> listener;  
private final Clock clock;
```

```
StartTrialClusterTask(Logger logger, String clusterName, Clock clock, PostStartTrialRequest request,  
    ActionListener<PostStartTrialResponse> listener) {  
    this.logger = logger;  
    this.clusterName = clusterName;  
    this.request = request;  
    this.listener = listener;  
    this.clock = clock;  
}
```

```
@Override
```

```
public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {  
    LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);  
    logger.debug("started self generated trial license: {}", oldLicensesMetaData);  
  
    if (request.isAcknowledged() == false) {  
        listener.onResponse(new  
PostStartTrialResponse(PostStartTrialResponse.Status.NEED_ACKNOWLEDGEMENT,  
            ACK_MESSAGES, ACKNOWLEDGEMENT_HEADER));  
    } else if (oldLicensesMetaData == null || oldLicensesMetaData.isEligibleForTrial()) {  
        listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.UPGRADED_TO_TRIAL));  
    } else {  
        listener.onResponse(new  
PostStartTrialResponse(PostStartTrialResponse.Status.TRIAL_ALREADY_ACTIVATED));  
    }  
}
```

```
@Override
```

```
public ClusterState execute(ClusterState currentState) throws Exception {  
    XPackPlugin.checkReadyForXPackCustomMetadata(currentState);  
    LicensesMetaData currentLicensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);  
  
    if (request.isAcknowledged() == false) {  
        return currentState;  
    } else if (currentLicensesMetaData == null || currentLicensesMetaData.isEligibleForTrial()) {  
        long issueDate = clock.millis();  
        Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
```

```

        long expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();

        License.Builder specBuilder = License.builder()
            .uid(UUID.randomUUID().toString())
            .issuedTo(clusterName)
            .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
            .issueDate(issueDate)
            .type(request.getType())
            .expiryDate(expiryDate);
        License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
        LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense,
Version.CURRENT);
        mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
        return ClusterState.builder(currentState).metaData(mdBuilder).build();
    } else {
        return currentState;
    }
}

@Override
public void onFailure(String source, @Nullable Exception e) {
    logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
    listener.onFailure(e);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

    private boolean acknowledge = false;

    @Override
    public ActionRequestValidationException validate() {
        return null;
    }
}

```

```

public PostStartBasicRequest acknowledge(boolean acknowledge) {
    this.acknowledge = acknowledge;
    return this;
}

public boolean isAcknowledged() {
    return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
    super.readFrom(in);
    acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    super.writeTo(out);
    out.writeBoolean(acknowledge);
}
}
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package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetBasicStatusResponse extends ActionResponse {

    private boolean eligibleToStartBasic;

    GetBasicStatusResponse() {
    }

    GetBasicStatusResponse(boolean eligibleToStartBasic) {
        this.eligibleToStartBasic = eligibleToStartBasic;
    }

    boolean isEligibleToStartBasic() {
        return eligibleToStartBasic;
    }
}

```

```

}

@Override
public void readFrom(StreamInput in) throws IOException {
    eligibleToStartBasic = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
    out.writeBoolean(eligibleToStartBasic);
}
}
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package org.elasticsearch.license;

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.util.UUID;

abstract class ExpirationCallback {

    static final String EXPIRATION_JOB_PREFIX = ".license_expiration_job_";

    public enum Orientation {PRE, POST}

    /**
     * Callback that is triggered every <code>frequency</code> when
     * current time is between <code>max</code> and <code>min</code>
     * before license expiry.
     */
    public abstract static class Pre extends ExpirationCallback {

        /**
         * Callback schedule prior to license expiry
         *
         * @param min    latest relative time to execute before license expiry
         * @param max    earliest relative time to execute before license expiry
         * @param frequency interval between execution
         */
        Pre(TimeValue min, TimeValue max, TimeValue frequency) {
            super(Orientation.PRE, min, max, frequency);
        }
    }
}

```

```

}

/**
 * Callback that is triggered every <code>frequency</code> when
 * current time is between <code>min</code> and <code>max</code>
 * after license expiry.
 */
public abstract static class Post extends ExpirationCallback {

    /**
     * Callback schedule after license expiry
     *
     * @param min    earliest relative time to execute after license expiry
     * @param max    latest relative time to execute after license expiry
     * @param frequency interval between execution
     */
    Post(TimeValue min, TimeValue max, TimeValue frequency) {
        super(Orientation.POST, min, max, frequency);
    }
}

private final String id;
private final Orientation orientation;
private final long min;
private final long max;
private final long frequency;

private ExpirationCallback(Orientation orientation, TimeValue min, TimeValue max, TimeValue frequency) {
    this.orientation = orientation;
    this.min = (min == null) ? 0 : min.getMillis();
    this.max = (max == null) ? Long.MAX_VALUE : max.getMillis();
    this.frequency = frequency.getMillis();
    this.id = String.join("", EXPIRATION_JOB_PREFIX, UUID.randomUUID().toString());
}

public final String getId() {
    return id;
}

public final long getFrequency() {
    return frequency;
}

/**
 * Calculates the delay for the next trigger time. When <code>now</code> is in a
 * valid time bracket with respect to <code>expirationDate</code>, the delay is 0.
 * When <code>now</code> is before the time bracket, than delay to the start of the
 * time bracket and when <code>now</code> is passed the valid time bracket, the delay

```

```

* is <code>null</code>
* @param expirationDate license expiry date in milliseconds
* @param now current time in milliseconds
* @return time delay
*/
final TimeValue delay(long expirationDate, long now) {
    final TimeValue delay;
    switch (orientation) {
        case PRE:
            if (expirationDate >= now) {
                // license not yet expired
                long preExpiryDuration = expirationDate - now;
                if (preExpiryDuration > max) {
                    // license duration is longer than maximum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(preExpiryDuration - max);
                } else if (preExpiryDuration <= max && preExpiryDuration >= min) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            } else {
                // invalid after license expiry
                delay = null;
            }
            break;
        case POST:
            if (expirationDate >= now) {
                // license not yet expired, delay it to the first match time
                delay = TimeValue.timeValueMillis(expirationDate - now + min);
            } else {
                // license has expired
                long expiredDuration = now - expirationDate;
                if (expiredDuration < min) {
                    // license expiry duration is shorter than minimum duration, delay it to the first match time
                    delay = TimeValue.timeValueMillis(min - expiredDuration);
                } else if (expiredDuration >= min && expiredDuration <= max) {
                    // no delay in valid time bracket
                    delay = TimeValue.timeValueMillis(0);
                } else {
                    // passed last match time
                    delay = null;
                }
            }
            break;
        default:
            throw new IllegalStateException("orientation [" + orientation + "] unknown");
    }
}

```

```

    }
    return delay;
}

/**
 * {@link SchedulerEngine.Schedule#nextScheduledTimeAfter(long, long)} with respect to
 * license expiry date
 */
public final long nextScheduledTimeForExpiry(long expiryDate, long startTime, long time) {
    TimeValue delay = delay(expiryDate, time);
    if (delay != null) {
        long delayInMillis = delay.getMillis();
        if (delayInMillis == 0L) {
            if (startTime == time) {
                // initial trigger and in time bracket, schedule immediately
                return time;
            } else {
                // in time bracket, add frequency
                return time + frequency;
            }
        } else {
            // not in time bracket
            return time + delayInMillis;
        }
    }
    return -1;
}

/**
 * Code to execute when the expiry callback is triggered in a valid
 * time bracket
 * @param license license to operate on
 */
public abstract void on(License license);

public final String toString() {
    return LoggerMessageFormat.format(null, "ExpirationCallback:(orientation [{}], min [{}], max [{}], freq
[{}])",
        orientation.name(), TimeValue.timeValueMillis(min), TimeValue.timeValueMillis(max),
        TimeValue.timeValueMillis(frequency));
}
}
{
"metadata": {
"name": "X-Pack Monitoring: License Expiration",
"xpack": {
"link": "license",
"expires_days": [ 60, 30, 14, 7 ],

```



```

"severity": 0,
"alert_index": ".monitoring-alerts-6",
"cluster_uuid": "${monitoring.watch.cluster_uuid}",
"type": "monitoring",
"version_created": 6020099,
"watch": "${monitoring.watch.id}"
}
},
"trigger": {
  "schedule": {
    "interval": "1m"
  }
},
"input": {
  "chain": {
    "inputs": [
      {
        "check": {
          "search": {
            "request": {
              "indices": [
                ".monitoring-es-*"
              ],
              "body": {
                "size": 1,
                "sort": [
                  {
                    "timestamp": {
                      "order": "desc"
                    }
                  }
                ]
              },
            ],
            "_source": [
              "license.*"
            ],
            "query": {
              "bool": {
                "filter": [
                  {
                    "term": {
                      "cluster_uuid": "${ctx.metadata.xpack.cluster_uuid}"
                    }
                  },
                  {
                    "term": {
                      "type": "cluster_stats"
                    }
                  }
                ]
              },
            ],

```

```

        {
          "range": {
            "timestamp": {
              "gte": "now-2m"
            }
          }
        }
      ]
    }
  }
}
},
{
  "alert": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-alerts-6"
        ],
        "body": {
          "size": 1,
          "terminate_after": 1,
          "query": {
            "bool": {
              "filter": {
                "term": {
                  "_id": "{{ctx.watch_id}}"
                }
              }
            }
          },
          "sort": [
            { "timestamp": { "order": "desc" } }
          ]
        }
      }
    }
  },
  "kibana_settings": {
    "search": {
      "request": {
        "indices": [
          ".monitoring-kibana-6-*"
        ]
      }
    }
  }
}

```

```

    ],
    "body": {
      "size": 1,
      "query": {
        "bool": {
          "filter": {
            "term": {
              "type": "kibana_settings"
            }
          }
        }
      },
      "sort": [
        {
          "timestamp": {
            "order": "desc"
          }
        }
      ]
    }
  },
  "condition": {
    "script": {
      "source": "if (ctx.payload.check.hits.total == 0) {return false;}def license =
ctx.payload.check.hits.hits[0]._source.license;if (license == null) {return false;}ctx.vars.fails_check = false;Instant
expiry = Instant.ofEpochMilli(license.expiry_date_in_millis);ctx.vars.expiry = expiry;if (license.status != 'active')
{ctx.vars.expired = true;ctx.vars.fails_check = true;ctx.metadata.xpack.severity = 2001;} else {Instant now =
Instant.ofEpochMilli(new Date().getTime());ctx.vars.now = now;for (int i = ctx.metadata.xpack.expires_days.length
- 1;i > -1;--i) {if (license.type == 'trial' && i < 2) {break;}Instant fromNow =
now.plusSeconds(ctx.metadata.xpack.expires_days[i] * 24 * 60 * 60);if (fromNow.isAfter(expiry))
{ctx.vars.fails_check = true;ctx.metadata.xpack.severity = i * 1000;break;}}ctx.vars.not_resolved =
(ctx.payload.alert.hits.total == 1 && ctx.payload.alert.hits.hits[0]._source.resolved_timestamp ==
null);ctx.vars.update = ctx.vars.fails_check || ctx.vars.not_resolved;"
    },
    "transform": {
      "script": {
        "source": "ctx.vars.email_recipient = (ctx.payload.kibana_settings.hits.total > 0) ?
ctx.payload.kibana_settings.hits.hits[0]._source.kibana_settings.xpack.default_admin_email : null;ctx.vars.is_new =
ctx.vars.fails_check && !ctx.vars.not_resolved;ctx.vars.is_resolved = !ctx.vars.fails_check &&
ctx.vars.not_resolved;def alertMessage = null;if (ctx.vars.fails_check) { alertMessage = 'Update your license.';} if
(ctx.vars.not_resolved) { ctx.payload = ctx.payload.alert.hits.hits[0]._source;ctx.payload.metadata =

```

```

ctx.metadata.xpack;if (ctx.vars.fails_check == false) { ctx.payload.resolved_timestamp = ctx.execution_time;} }
else { ctx.payload = [ 'timestamp': ctx.execution_time, 'prefix': 'This cluster\'s license is going to expire in
{{#relativeTime}}metadata.time{{/relativeTime}} at {{#absoluteTime}}metadata.time{{/absoluteTime}}.',
'message': alertMessage, 'metadata': ctx.metadata.xpack ]; if (ctx.vars.fails_check) { ctx.payload.metadata.time =
ctx.vars.expiry.toString();} ctx.payload.update_timestamp = ctx.execution_time;return ctx.payload;"
}
},
"actions": {
  "add_to_alerts_index": {
    "index": {
      "index": ".monitoring-alerts-6",
      "doc_type": "doc",
      "doc_id": "${monitoring.watch.unique_id}"
    }
  },
  "send_email_to_admin": {
    "condition": {
      "script": "return ctx.vars.email_recipient != null && (ctx.vars.is_new || ctx.vars.is_resolved)"
    },
    "email": {
      "to": "X-Pack Admin <{{ctx.vars.email_recipient}}>",
      "from": "X-Pack Admin <{{ctx.vars.email_recipient}}>",
      "subject":
"{{{#ctx.vars.is_new}}NEW{{/ctx.vars.is_new}}{{{#ctx.vars.is_resolved}}RESOLVED{{/ctx.vars.is_resolved}}
{{ctx.metadata.name}}",
      "body": {
        "text": "{{#ctx.vars.is_resolved}}This cluster alert has been resolved: {{/ctx.vars.is_resolved}} This cluster's
license {{{#ctx.vars.is_new}}is going to expire on
{{ctx.payload.metadata.time}}{{/ctx.vars.is_new}}{{{#ctx.vars.is_resolved}}was going to
expire{{ctx.payload.metadata.time}}{{/ctx.vars.is_resolved}}.
{{{#ctx.vars.is_new}}{{ctx.payload.message}}{{/ctx.vars.is_new}}"
      }
    }
  }
}
}
}
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```

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 */
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import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.ml.action.CloseJobAction;
import org.elasticsearch.xpack.core.ml.action.DeleteDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.DeleteJobAction;
import org.elasticsearch.xpack.core.ml.action.GetDatafeedsStatsAction;
import org.elasticsearch.xpack.core.ml.action.GetJobsStatsAction;
import org.elasticsearch.xpack.core.ml.action.OpenJobAction;
import org.elasticsearch.xpack.core.ml.action.PutDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.PutJobAction;
import org.elasticsearch.xpack.core.ml.action.StartDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.StopDatafeedAction;
import org.elasticsearch.xpack.core.ml.client.MachineLearningClient;
import org.elasticsearch.xpack.core.ml.datafeed.DatafeedState;
import org.elasticsearch.xpack.core.ml.job.config.JobState;
import org.elasticsearch.persistent.PersistentTasksCustomMetaData;
import org.elasticsearch.xpack.ml.LocalStateMachineLearning;
import org.elasticsearch.xpack.ml.support.BaseMlIntegTestCase;
import org.junit.Before;

import java.util.Collections;

import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;

@TestLogging("org.elasticsearch.xpack.ml.action:DEBUG")
public class MachineLearningLicensingTests extends BaseMlIntegTestCase {

    @Before

```

```

public void resetLicensing() {
    enableLicensing();

    ensureStableCluster(1);
    ensureYellow();
}

public void testMachineLearningPutJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningputjobactionrestricted";
    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        listener.actionGet();
        fail("put job action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
            hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
        PutJobAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testMachineLearningOpenJobActionRestricted() throws Exception {
    String jobId = "testmachinelearningopenjobactionrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work

```

```

Settings settings = internalCluster().transportClient().settings();
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
    PutJobAction.Response response = putJobListener.actionGet();
    assertNotNull(response);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);
// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
    listener.actionGet();
    fail("open job action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);

// now that the license is invalid, the job should get closed:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
});

// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
    OpenJobAction.Response response = listener.actionGet();
    assertNotNull(response);
}

```

```

    }
}

public void testMachineLearningPutDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningputdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(false);
    // test that license restricted apis do not work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
        listener.actionGet();
        fail("put datafeed action should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
        assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
    }

    // Pick a license that does allow machine learning
    mode = randomValidLicenseType();
    enableLicensing(mode);
    assertMLAllowed(true);
    // test that license restricted apis do now work
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();

```

```

        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
        PutDatafeedAction.Response response = listener.actionGet();
        assertNotNull(response);
    }
}

public void testAutoCloseJobWithDatafeed() throws Exception {
    String jobId = "testautoclosejobwithdatafeed";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        // put job
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        // put datafeed
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        // open job
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
        // start datafeed
        PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
        listener.actionGet();
    }

    if (randomBoolean()) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        disableLicensing();
    }
}

```

```

assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STOPPED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

enableLicensing(randomValidLicenseType());
assertMLAllowed(true);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    // open job
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);
    // start datafeed
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
}

assertBusy() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.OPENED, jobState);

    DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
    assertEquals(DatafeedState.STARTED, datafeedState);

    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
    assertEquals(2, tasks.taskMap().size());
});

if (randomBoolean()) {
    enableLicensing(randomInvalidLicenseType());
} else {

```

```

        disableLicensing();
    }
    assertMLAllowed(false);

    // now that the license is invalid, the job should be closed and datafeed stopped:
    assertBusy() -> {
        JobState jobState = getJobStats(jobId).getState();
        assertEquals(JobState.CLOSED, jobState);

        DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
        assertEquals(DatafeedState.STOPPED, datafeedState);

        ClusterState state = client().admin().cluster().prepareState().get().getState();
        PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
        assertEquals(0, tasks.taskMap().size());
    });
}

public void testMachineLearningStartDatafeedActionRestricted() throws Exception {
    String jobId = "testmachinelearningstartdatafeedactionrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }

    // Pick a license that does not allow machine learning
    License.OperationMode mode = randomInvalidLicenseType();

```

```

enableLicensing(mode);
assertMLAllowed(false);

// now that the license is invalid, the job should get closed:
assertBusy(() -> {
    JobState jobState = getJobStats(jobId).getState();
    assertEquals(JobState.CLOSED, jobState);
    ClusterState state = client().admin().cluster().prepareState().get().getState();
    PersistentTasksCustomMetadata tasks = state.metaData().custom(PersistentTasksCustomMetadata.TYPE);
    assertEquals(0, tasks.taskMap().size());
});

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    listener.actionGet();
    fail("start datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
    assertThat(e.status(), is(RestStatus.FORBIDDEN));
    assertThat(e.getMessage(), containsString("non-compliant"));
    assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);
// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    // re-open job now that the license is valid again
    PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
    OpenJobAction.Response openJobResponse = openJobListener.actionGet();
    assertNotNull(openJobResponse);

    PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
    new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
    StartDatafeedAction.Response response = listener.actionGet();
    assertNotNull(response);
}

```



```

}

public void testMachineLearningStopDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningstopdatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    String datafeedIndex = jobId + "-data";
    prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
        XContentType.JSON).get();
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
        ());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(datafeedIndex))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
        PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).startDatafeed(
            new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
        StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
        assertNotNull(startDatafeedResponse);
    }

    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        enableLicensing(randomValidLicenseType());
    }

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
        ());
        PlainActionFuture<StopDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).stopDatafeed(new StopDatafeedAction.Request(datafeedId), listener);
        if (invalidLicense) {

```

```

// the stop datafeed due to invalid license happens async, so check if the datafeed turns into stopped state:
assertBusy(() -> {
    GetDatafeedsStatsAction.Response response =
        new MachineLearningClient(client)
            .getDatafeedsStats(new GetDatafeedsStatsAction.Request(datafeedId)).actionGet();
    assertEquals(DatafeedState.STOPPED, response.getResponse().results().get(0).getDatafeedState());
});
} else {
    listener.actionGet();
}

if (invalidLicense) {
    // the close due to invalid license happens async, so check if the job turns into closed state:
    assertBusy(() -> {
        GetJobsStatsAction.Response response =
            new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
        assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
    });
}
}

public void testMachineLearningCloseJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
        OpenJobAction.Response openJobResponse = openJobListener.actionGet();
        assertNotNull(openJobResponse);
    }

    boolean invalidLicense = randomBoolean();
    if (invalidLicense) {
        enableLicensing(randomInvalidLicenseType());
    } else {
        enableLicensing(randomValidLicenseType());
    }
}

```

```

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
    PlainActionFuture<CloseJobAction.Response> listener = PlainActionFuture.newFuture();
    CloseJobAction.Request request = new CloseJobAction.Request(jobId);
    request.setCloseTimeout(TimeValue.timeValueSeconds(20));
    if (invalidLicense) {
        // the close due to invalid license happens async, so check if the job turns into closed state:
        assertBusy(() -> {
            GetJobsStatsAction.Response response =
                new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
            assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
        });
    } else {
        new MachineLearningClient(client).closeJob(request, listener);
        listener.actionGet();
    }
}
}

public void testMachineLearningDeleteJobActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningclosejobactionnotrestricted";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
    }

    // Pick a random license
    License.OperationMode mode = randomLicenseType();
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).deleteJob(new DeleteJobAction.Request(jobId), listener);
        listener.actionGet();
    }
}
}

```

```

public void testMachineLearningDeleteDatafeedActionNotRestricted() throws Exception {
    String jobId = "testmachinelearningdeletedatafeedactionnotrestricted";
    String datafeedId = jobId + "-datafeed";
    assertMLAllowed(true);
    // test that license restricted apis do now work
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
        PutJobAction.Response putJobResponse = putJobListener.actionGet();
        assertNotNull(putJobResponse);
        PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).putDatafeed(
            new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
                Collections.singletonList(jobId))), putDatafeedListener);
        PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
        assertNotNull(putDatafeedResponse);
    }

    // Pick a random license
    License.OperationMode mode = randomLicenseType();
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
        client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
        PlainActionFuture<DeleteDatafeedAction.Response> listener = PlainActionFuture.newFuture();
        new MachineLearningClient(client).deleteDatafeed(new DeleteDatafeedAction.Request(datafeedId,
listener);
        listener.actionGet();
    }

    private static OperationMode randomInvalidLicenseType() {
        return randomFrom(License.OperationMode.GOLD, License.OperationMode.STANDARD,
License.OperationMode.BASIC);
    }

    private static OperationMode randomValidLicenseType() {
        return randomFrom(License.OperationMode.TRIAL, License.OperationMode.PLATINUM);
    }

    private static OperationMode randomLicenseType() {
        return randomFrom(License.OperationMode.values());
    }

```



```

## current license version
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
8o2e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWh0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQRn3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOuml4MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUumVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dlMbmMzSGtQ
c3FWOTgzZ3ZUCXmVQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQBZhvozA0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXC18kX1SrgoFn1bXq61IvJwfw5qnmYNiH3hRhTO9EyaCBqaLk8
NXZQ6TrRkQSpEnnBwAYUkZeKXsuBoOk4B4mzwc/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWKbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"}]}

- match: { license_status: "valid" }

- do:
  xpack.license.get: {}

## a license object has 11 attributes
- length: { license: 11 }

## bwc for licenses format
- do:
  xpack.license.post:
    acknowledge: true
    body: |
      {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"ma
x_nodes":1,"issued_to":"issued_to","issuer":"issuer","signature":"AAAAAwAAAA2T3vqdBBetKQaBgxipAAAB
mC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2M
XMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS09
5MXRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQRn3JQeGwxboU0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEph
ZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOuml4MXNuL0pSOE
hQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUumVHNDZ2R3o2V
E1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dlMbmMzS
GtQc3FWOTgzZ3ZUCXmVQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB7pG
FYgawfLm9zzT80LvcLHjy1t/v2uSzCQWKdXXhrwSy4WrAH2uK/+PEiQ7aEpW5erLsyJ5KLA6OEZJDaP7r+mj
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PIGX+2YjhtUeQhmlCPdlxc9wECJ7/knPss5bI3ZoXQR3fyXhjXNnHEIsblqLrMCaI3pLxs7II+KPYMa2ZYL/am4

```

P"]}]}

- match: { license_status: "valid" }

- do:

 xpack.license.get: { }

- length: { license: 11 }

license version: 1.x

- do:

 xpack.license.post:

 acknowledge: true

 body: |

```
    {"licenses":[{"uid":"893361dc-9749-4997-93cb-802e3d7fa4a8","type":"subscription","subscription_type":"gold","issue_date_in_millis":1411948800000,"feature":"shield","expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAQAAAA0LVAYwWpSH94cyXr4zAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWKprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSErIZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53Mwk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNke9PQAAAQA4qsc/URRZVdFoLwgy9dqybYEQLW8YLkiAyPV5XHHHdtk+dtZlEpiNEDkUXhSX2waVJlsNRF8/4kqplDfwNoD2TUM8fTgiIfiSiZYGDTGST+yW/5eAveEU5J5v1liBN27bwkqL+V4YAa0Tcm7NKKwjScWKAHiTU3vF8chPkGfCHE0kQgVwPC9RE82pTw0s6/uR4PflGNFfqPM0uiE5nucfVrtj89JQio/KA/7ZyFbo7VTNXxZQt7T7rZWBCP9KIjptXzcWuk08Q5S+rSoJNYbFo3HGKtrCVsRz/55rceNtdwKKXu1IwnSeir4I1/KLduQTtFLy0+1th87VS8T88UT"}]}
```

- match: { license_status: "valid" }

- do:

 xpack.license.get: { }

- length: { license: 11 }

multiple licenses version: 1.x

- do:

 xpack.license.post:

 acknowledge: true

 body: |

```
    {"licenses":[{"uid":"893361dc-9749-4997-93cb-802e3d7fa4a8","type":"internal","subscription_type":"none","issue_date_in_millis":1411948800000,"feature":"shield","expiry_date_in_millis":1440892799999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAQAAAA04Q4ky3rFyyWLFkytEAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWKprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0
```

```
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AAAAAQAAAA0Sc90guRiaQEmgLvMnAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMV
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U0MXZ0dDJHSERiZTVLOHNzSDBYwNpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktN
WGM5TUhQV2plaUo4Q1JOUmL4MXNuL0pSOEHqaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53Mwk2K055c2
8zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJEN
DVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRW
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VBY7ij4WnoP3ce7Zjs9TwHn+IqzftC6"}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
- match: { license.uid: "893361dc-9749-4997-93cb-802e3dofh7aa" }
```

```
---
```

```
"Should throw 404 after license deletion":
```

```
- do:
```

```
  xpack.license.delete: { }
```

```
- match: { acknowledged: true }
```

```
- do:
```

```
  xpack.license.get: { }
```

```
  catch: missing
```

```
---
```

```
"Should install a feature type license":
```

```
  # VERSION_NO_FEATURE_TYPE license version
```

```
- do:
```

```
  xpack.license.post:
```



```
acknowledge: true
body: |
  {"license": {"uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "gold", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issued_to", "issuer": "issuer", "signature": "AAAAAaAAAA3U8+YmnmvWC+CWsV/mRAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB e8GfzDm6T537Iuuvjetb3xK5dvg0K5NQapv+rczWcQFxcGuzbF8plkgetP1aAGZP4uRESDQPMIOCsx4d0UqqAm9f7GbbQ3193P+PogInPFfeEH9NvOmaAQovmxVM9SE6DsDqLX4cXSO+bgWpXPTd2LmpoQc1fXd6BZ8GeuyYpVHVkP9hVU0tAYjw6HzYOE7+zuO1oJYOxElqy66AnIfkvHrvni+flym3tE7tDTgsDRaz7W3iBhaqiSntEqabEkvHdPHQdSR99XGaEvnHO1paK01/35iZF6OXHsF7CCj+558GRXiVxzueOe7TsGSSt8g7YjZwV9bRCyU7oB4B/nidgI"} }
```

```
- match: { license_status: "valid" }
```

```
- do:
  xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
---
```

```
"Cannot start basic":
```

```
- do:
  catch: bad_request
  xpack.license.post:
    acknowledge: true
    body: |
      {"license": {"uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "basic", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAaAAAA0IKPZ0a7aZquUltho/AAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQAALuQ44S3IG6SzolcXVJ6Z4CIXORDrYQ+wdLceey0XdujTslAOj+k+vNgo6wauc7Uswi01esHu4lb5IgpvKy7RRCbh5bj/z2ubu2qMJqopp9BQyD7VQjVfqmG6seUMJwJ1a5Avvm9r41YPSPrCii3bKK2e1l6jK6N8ibCvnTyY/XkYGCJrBWT SJepDbg6ErbyodrZ37x1StLbPWcNAkmweyHjDJnvYnbeZZO7A3NmubXZjW7Ttf8/YwQyE00PqMcl7fVPY3hkKpAeHf8aaJbqkKYbqZuER3EWJX7ZvLVb1dNdNg8aXRn7YrkQcYwWgptYQpfV+D7yEJ4j5muAEoler" } }
```

```
- match: { error.root_cause.0.reason: 'Installing basic licenses is no longer allowed. Use the POST
```

/_xpack/license/start_basic API to install a basic license that does not expire.' }

"Should fail gracefully when body content is not provided":

- do:

catch: bad_request
xpack.license.post:
acknowledge: true

- match: { error.root_cause.0.reason: 'The license must be provided in the request body' }

"Current license is trial means not eligible to start trial":

- do:

xpack.license.get_trial_status: { }

- match: { eligible_to_start_trial: false }

- do:

xpack.license.post_start_basic:
acknowledge: true

- match: { basic_was_started: true }

- do:

xpack.license.get_trial_status: { }

- match: { eligible_to_start_trial: false }

- do:

catch: forbidden
xpack.license.post_start_trial:
acknowledge: true

- match: { trial_was_started: false }

- match: { error_message: "Operation failed: Trial was already activated." }

"Trial license cannot be basic":

- do:

catch: bad_request
xpack.license.post_start_trial:
type: "basic"
acknowledge: true

"Can start basic license if do not already have basic":

- do:

xpack.license.get_basic_status: { }

```

- match: { eligible_to_start_basic: true }

- do:
  xpack.license.post_start_basic:
    acknowledge: true

- match: { basic_was_started: true }
- match: { acknowledged: true }

- do:
  xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: false }

- do:
  catch: forbidden
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: true }
- match: { error_message: "Operation failed: Current license is basic." }
---
"Must acknowledge to start basic":
- do:
  xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: false }
- match: { error_message: "Operation failed: Needs acknowledgement." }
{
  "xpack.license.delete": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["DELETE"],
    "url": {
      "path": "/_xpack/license",
      "paths": ["/_xpack/license"],
      "parts": {}
    },
  },
  "body": null
}
{
  "xpack.license.get": {
    "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
    "methods": ["GET"],
    "url": {
      "path": "/_xpack/license",
      "paths": ["/_xpack/license"],

```

```

"parts" : {
},
"params": {
  "local": {
    "type" : "boolean",
    "description" : "Return local information, do not retrieve the state from master node (default: false)"
  }
}
},
"body": null
}
}
{
"xpack.license.post_start_basic": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["POST"],
  "url": {
    "path": "/_xpack/license/start_basic",
    "paths": ["/_xpack/license/start_basic"],
    "parts" : {
    },
    "params": {
      "acknowledge": {
        "type" : "boolean",
        "description" : "whether the user has acknowledged acknowledge messages (default: false)"
      }
    }
  },
  "body": null
}
}
{
"xpack.license.get_trial_status": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["GET"],
  "url": {
    "path": "/_xpack/license/trial_status",
    "paths": ["/_xpack/license/trial_status"],
    "parts" : {
    },
    "params": {
    }
  },
  "body": null
}
}
{
"xpack.license.post": {

```

```

"documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
"methods": ["PUT", "POST"],
"url": {
  "path": "/_xpack/license",
  "paths": ["/_xpack/license"],
  "parts": {
  },
  "params": {
    "acknowledge": {
      "type": "boolean",
      "description": "whether the user has acknowledged acknowledge messages (default: false)"
    }
  }
},
"body": {
  "description": "licenses to be installed"
}
}
}
{
"xpack.license.post_start_trial": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["POST"],
  "url": {
    "path": "/_xpack/license/start_trial",
    "paths": ["/_xpack/license/start_trial"],
    "parts": {
    },
    "params": {
      "type": {
        "type": "string",
        "description": "The type of trial license to generate (default: \"trial\")"
      },
      "acknowledge": {
        "type": "boolean",
        "description": "whether the user has acknowledged acknowledge messages (default: false)"
      }
    }
  },
  "body": null
}
}
{
"xpack.license.get_basic_status": {
  "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
  "methods": ["GET"],
  "url": {
    "path": "/_xpack/license/basic_status",

```

```
"paths": ["/_xpack/license/basic_status"],
"parts" : {
},
"params": {
}
},
"body": null
}
}
```

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```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <link rel="dns-prefetch" href="https://assets-cdn.github.com">
  <link rel="dns-prefetch" href="https://avatars0.githubusercontent.com">
  <link rel="dns-prefetch" href="https://avatars1.githubusercontent.com">
  <link rel="dns-prefetch" href="https://avatars2.githubusercontent.com">
  <link rel="dns-prefetch" href="https://avatars3.githubusercontent.com">
  <link rel="dns-prefetch" href="https://github-cloud.s3.amazonaws.com">
  <link rel="dns-prefetch" href="https://user-images.githubusercontent.com/">

  <link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/frameworks-
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  <link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/github-
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  <meta name="viewport" content="width=device-width">

  <title>cryptacular/NOTICE at master · vt-middlewre/cryptacular · GitHub</title>
  <link rel="search" type="application/opensearchdescription+xml" href="/opensearch.xml" title="GitHub">
  <link rel="fluid-icon" href="https://github.com/fluidicon.png" title="GitHub">
  <meta property="fb:app_id" content="1401488693436528">

  <meta content="https://avatars7.githubusercontent.com/u/6122907?v=4&s=400" property="og:image" /><meta
content="GitHub" property="og:site_name" /><meta content="object" property="og:type" /><meta content="vt-
middlewre/cryptacular" property="og:title" /><meta content="https://github.com/vt-middlewre/cryptacular"
property="og:url" /><meta content="cryptacular - The friendly complement to the BouncyCastle crypto API for
Java." property="og:description" />

  <link rel="assets" href="https://assets-cdn.github.com/">

  <meta name="pjax-timeout" content="1000">

  <meta name="request-id" content="E0E4:26F16:12A5AE6:1D11801:596C7978" data-pjax-transient>
```

```
<meta name="selected-link" value="repo_source" data-pjax-transient>

<meta name="google-site-verification" content="KT5gs8h0wvaagLKA VWq8bbeNwnZZK1r1XQysX3xurLU">
<meta name="google-site-verification" content="ZzhVyEFwb7w3e0-uOTltm8Jsck2F5StVihD0exw2fsA">
  <meta name="google-analytics" content="UA-3769691-2">

<meta content="collector.githubapp.com" name="octolytics-host" /><meta content="github" name="octolytics-app-
id" /><meta content="https://collector.githubapp.com/github-external/browser_event" name="octolytics-event-url"
/><meta content="E0E4:26F16:12A5AE6:1D11801:596C7978" name="octolytics-dimension-request_id" /><meta
content="sea" name="octolytics-dimension-region_edge" /><meta content="iad" name="octolytics-dimension-
region_render" />
<meta content="/<user-name>/<repo-name>/blob/show" data-pjax-transient="true" name="analytics-location" />

<meta class="js-ga-set" name="dimension1" content="Logged Out">

  <meta name="hostname" content="github.com">
<meta name="user-login" content="">

  <meta name="expected-hostname" content="github.com">
  <meta name="js-proxy-site-detection-payload"
content="N2ZhMjk0NTA4MjI1NmZhYTVINzM5NzVjZmFkOWY2NGFkNmMxYzcyMGViNzAzZGQxMGMzZ
mJhZDQ3YWZiZTI0OHx7InJlbW90ZV9hZGRyZXNzIjoiMTEwLjIwLjIyMC4xMzUiLCJyZXF1ZXN0X2lkIjoiR
TBFNDoyNkYxNjoxMkE1QUU2OjFEMTE4MDE6NTk2Qzc5NzgiLCJ0aW1lc3RhbnXAiOjE1MDAyODEyMDgsI
mhvc3QiOiIjInaXRodWIuY29tIn0=">

<meta name="html-safe-nonce" content="5aa226b80a18dc40894e1d405e4eb31cfca7d616">

<meta http-equiv="x-pjax-version" content="f682644ce1bb9629b9d9d9bedf64801b">

  <link href="https://github.com/vt-middlewre/cryptacular/commits/master.atom" rel="alternate" title="Recent
Commits to cryptacular:master" type="application/atom+xml">

  <meta name="description" content="cryptacular - The friendly complement to the BouncyCastle crypto API for
Java.">
  <meta name="go-import" content="github.com/vt-middlewre/cryptacular git https://github.com/vt-
middleware/cryptacular.git">

  <meta content="6122907" name="octolytics-dimension-user_id" /><meta content="vt-middlewre"
name="octolytics-dimension-user_login" /><meta content="15714989" name="octolytics-dimension-repository_id">
```



```
</><meta content="vt-middlewre/cryptacular" name="octolytics-dimension-repository_nwo" /><meta
content="true" name="octolytics-dimension-repository_public" /><meta content="false" name="octolytics-
dimension-repository_is_fork" /><meta content="15714989" name="octolytics-dimension-
repository_network_root_id" /><meta content="vt-middlewre/cryptacular" name="octolytics-dimension-
repository_network_root_nwo" /><meta content="false" name="octolytics-dimension-
repository_explore_github_marketplace_ci_cta_shown" />
```

```
<link rel="canonical" href="https://github.com/vt-middlewre/cryptacular/blob/master/NOTICE" data-pjax-
transient>
```

```
<meta name="browser-stats-url" content="https://api.github.com/_private/browser/stats">
```

```
<meta name="browser-errors-url" content="https://api.github.com/_private/browser/errors">
```

```
<link rel="mask-icon" href="https://assets-cdn.github.com/pinned-octocat.svg" color="#000000">
```

```
<link rel="icon" type="image/x-icon" href="https://assets-cdn.github.com/favicon.ico">
```

```
<meta name="theme-color" content="#1e2327">
```

```
</head>
```

```
<body class="logged-out env-production page-blob">
```

```
<div class="position-relative js-header-wrapper ">
```

```
<a href="#start-of-content" tabindex="1" class="px-2 py-4 show-on-focus js-skip-to-content">Skip to content</a>
```

```
<div id="js-pjax-loader-bar" class="pjax-loader-bar"><div class="progress"></div></div>
```

```
<header class="site-header js-details-container Details" role="banner">
```

```
<div class="site-nav-container">
```

```
<a class="header-logo-invertocat" href="https://github.com/" aria-label="Homepage" data-ga-click="(Logged out)
Header, go to homepage, icon:logo-wordmark">
```

```
<svg aria-hidden="true" class="octicon octicon-mark-github" height="32" version="1.1" viewBox="0 0 16 16"
width="32"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59.4.07.55-.17.55-.38
0-.19-.01-.82-.01-1.49-2.01-.37-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53.63-.01
1.08.58 1.23.82.72 1.21 1.87.87 2.33.66.07-.52.28-.87.51-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87.31-1.59.82-2.15-.08-.2-.36-
```

```
1.02.08-2.12 0 0 .67-.21 2.2.82.64-.18 1.32-.27 2-.27.68 0 1.36.09 2 .27 1.53-1.04 2.2-.82 2.2-.82.44 1.1.16 1.92.08
2.12.51.56.82 1.27.82 2.15 0 3.07-1.87 3.75-3.65 3.95.29.25.54.73.54 1.48 0 1.07-.01 1.93-.01 2.2 0
.21.15.46.55.38A8.013 8.013 0 0 0 16 8c0-4.42-3.58-8-8-8z"/></svg>
</a>
```

```
<button class="btn-link float-right site-header-toggle js-details-target" type="button" aria-label="Toggle
navigation" aria-expanded="false">
  <svg aria-hidden="true" class="octicon octicon-three-bars" height="24" version="1.1" viewBox="0 0 12 16"
width="18"><path fill-rule="evenodd" d="M11.41 9H.59C0 9 0 8.59 0 8c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0
.59 0 1-.59 1h.01zm0-4H.59C0 5 0 4.59 0 4c0-.59 0-1 .59-1H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1h.01zM.59
11H11.4c.59 0 .59.41.59 1 0 .59 0 1-.59 1H.59C0 13 0 12.59 0 12c0-.59 0-1 .59-1z"/></svg>
</button>
```

```
<div class="site-header-menu">
  <nav class="site-header-nav">
    <a href="/features" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:features" data-selected-links="/features /features/code-review /features/project-management
/features/integrations /features">
      Features
    </a>
    <a href="/business" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:business" data-selected-links="/business /business/security /business/customers /business">
      Business
    </a>
    <a href="/explore" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:explore" data-selected-links="/explore /trending /trending/developers /stars /integrations
/integrations/feature/code /integrations/feature/collaborate /integrations/feature/ship showcases showcases_search
showcases_landing /explore">
      Explore
    </a>
    <a href="/marketplace" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav
menu - item:marketplace" data-selected-links="/marketplace">
      Marketplace
    </a>
    <a href="/pricing" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:pricing" data-selected-links="/pricing /pricing/developer /pricing/team /pricing/business-hosted
/pricing/business-enterprise /pricing">
      Pricing
    </a>
  </nav>
```

```
<div class="site-header-actions">
  <div class="header-search scoped-search site-scoped-search js-site-search" role="search">
    <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="/vt-
middleware/cryptacular/search" class="js-site-search-form" data-scoped-search-url="/vt-
middleware/cryptacular/search" data-unscooped-search-url="/search" method="get"><div
style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden" value="#x2713;" /></div>
    <label class="form-control header-search-wrapper js-chromeless-input-container">
      <a href="/vt-middleware/cryptacular/blob/master/NOTICE" class="header-search-scope no-underline">This
repository</a>
      <input type="text"
class="form-control header-search-input js-site-search-focus js-site-search-field is-clearable"
data-hotkey="s"
```

```
name="q"
value=""
placeholder="Search"
aria-label="Search this repository"
data-unscoped-placeholder="Search GitHub"
data-scoped-placeholder="Search"
autocapitalize="off">
  <input type="hidden" class="js-site-search-type-field" name="type" >
</label>
</form></div>
```

```
  <a class="text-bold site-header-link" href="/login?return_to=%2Fvt-
middleware%2Fcryptacular%2Fblob%2Fmaster%2FNOTICE" data-ga-click="(Logged out) Header, clicked Sign
in, text:sign-in">Sign in</a>
  <span class="text-gray">or</span>
  <a class="text-bold site-header-link" href="/join?source=header-repo" data-ga-click="(Logged out) Header,
clicked Sign up, text:sign-up">Sign up</a>
</div>
</div>
</div>
</header>
```

```
</div>
```

```
<div id="start-of-content" class="show-on-focus"></div>
```

```
<div id="js-flash-container">
</div>
```

```
<div role="main">
  <div itemscope itemtype="http://schema.org/SoftwareSourceCode">
    <div id="js-repo-pjax-container" data-pjax-container>
```

```
<div class="pagehead repohead instapaper_ignore readability-menu experiment-repo-nav">
  <div class="container repohead-details-container">
```

```
    <ul class="pagehead-actions">
      <li>
```

```

    <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
    class="btn btn-sm btn-with-count tooltiped tooltiped-n"
    aria-label="You must be signed in to watch a repository" rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-eye" height="16" version="1.1" viewBox="0 0 16 16"
    width="16"><path fill-rule="evenodd" d="M8.06 2C3 2 0 8 0 8s3 6 8.06 6C13 14 16 8 16 8s-3-6-7.94-6zM8 12c-
    2.2 0-4-1.78-4-4 0-2.2 1.8-4 4-4 2.2 0 4 1.8 4 4 0 2.2-1.78 4-4 4zm2-4c0 1.11-.89 2-2-1.11 0-2-.89-2-2 0-
    1.11.89-2 2-2 1.11 0 2 .89 2 2z"/></svg>
    Watch
  </a>
  <a class="social-count" href="/vt-middleware/cryptacular/watchers"
    aria-label="9 users are watching this repository">
    9
  </a>

</li>

<li>
  <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
  class="btn btn-sm btn-with-count tooltiped tooltiped-n"
  aria-label="You must be signed in to star a repository" rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-star" height="16" version="1.1" viewBox="0 0 14 16"
  width="14"><path fill-rule="evenodd" d="M14 6l-4.9-.64L7 1 4.9 5.36 0 6l3.6 3.26L2.67 14 7 11.67 11.33 14l-.93-
  4.74z"/></svg>
  Star
</a>

  <a class="social-count js-social-count" href="/vt-middleware/cryptacular/stargazers"
    aria-label="15 users starred this repository">
    15
  </a>

</li>

<li>
  <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
  class="btn btn-sm btn-with-count tooltiped tooltiped-n"
  aria-label="You must be signed in to fork a repository" rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-repo-forked" height="16" version="1.1" viewBox="0 0 10 16"
  width="10"><path fill-rule="evenodd" d="M8 1a1.993 1.993 0 0 0-1 3.72V6L5 8 3 6V4.72A1.993 1.993 0 0 0 2
  1a1.993 1.993 0 0 0-1 3.72V6.513 3v1.78A1.993 1.993 0 0 0 5 15a1.993 1.993 0 0 0 1-3.72V9.513-3V4.72A1.993
  1.993 0 0 0 8 1zM2 4.2C1.34 4.2.8 3.65.8 3c0-.65.55-1.2 1.2-1.2.65 0 1.25 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3 10c-
  .66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.25 1.2 1.2 0 .65-.55 1.2-1.2 1.2zm3-10c-.66 0-1.2-.55-1.2-1.2 0-
  .65.55-1.2 1.2-1.2.65 0 1.25 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
  Fork
</a>

  <a href="/vt-middleware/cryptacular/network" class="social-count"
    aria-label="1 user forked this repository">

```

```
1
</a>
</li>
</ul>

<h1 class="public ">
<svg aria-hidden="true" class="octicon octicon-repo" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M4 9H3V8h1v1zm0-3H3v1h1V6zm0-2H3v1h1V4zm0-
2H3v1h1V2zm8-1v12c0 .55-.45 1-1 1H6v2l-1.5-1.5L3 16v-2H1c-.55 0-1-.45-1-1V1c0-.55.45-1 1-1h10c.55 0 1 .45
1 1zm-1 10H1v2h2v-1h3v1h5v-2zm0-10H2v9h9V1z"/></svg>
<span class="author" itemprop="author"><a href="/vt-middleware" class="url fn" rel="author">vt-
middleware</a></span><!--
--><span class="path-divider"></span><!--
--><strong itemprop="name"><a href="/vt-middleware/cryptacular" data-pjax="#js-repo-pjax-
container">cryptacular</a></strong>

</h1>

</div>
<div class="container">

<nav class="reponav js-repo-nav js-sidenav-container-pjax"
  itemscope
  itemtype="http://schema.org/BreadcrumbList"
  role="navigation"
  data-pjax="#js-repo-pjax-container">

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular" class="js-selected-navigation-item selected reponav-item" data-hotkey="g
c" data-selected-links="repo_source repo_downloads repo_commits repo_releases repo_tags repo_branches /vt-
middleware/cryptacular" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-code" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M9.5 3L8 4.5 11.5 8 8 11.5 9.5 13 14 8 9.5 3zm-5 0L0 8l4.5 5L6 11.5
2.5 8 6 4.5 4.5 3z"/></svg>
    <span itemprop="name">Code</span>
    <meta itemprop="position" content="1">
  </a> </span>

<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular/issues" class="js-selected-navigation-item reponav-item" data-hotkey="g i"
data-selected-links="repo_issues repo_labels repo_milestones /vt-middleware/cryptacular/issues" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-issue-opened" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M7 2.3c3.14 0 5.7 2.56 5.7 5.7s-2.56 5.7-5.7 5.7A5.71 5.71 0 0 1 1.3
8c0-3.14 2.56-5.7 5.7-5.7zM7 1C3.14 1 0 4.14 0 8s3.14 7 7 7 7-3.14 7-7-3.14-7-7zm1 3H6v5h2V4zm0
6H6v2h2v-2z"/></svg>
    <span itemprop="name">Issues</span>
    <span class="Counter">4</span>
    <meta itemprop="position" content="2">
  </a> </span>

```



```
<span itemscope itemtype="http://schema.org/ListItem" itemprop="itemListElement">
  <a href="/vt-middleware/cryptacular/pulls" class="js-selected-navigation-item reponav-item" data-hotkey="g p"
  data-selected-links="repo_pulls /vt-middleware/cryptacular/pulls" itemprop="url">
    <svg aria-hidden="true" class="octicon octicon-git-pull-request" height="16" version="1.1" viewBox="0 0 12
    16" width="12"><path fill-rule="evenodd" d="M11 11.28V5c-.03-.78-.34-1.47-.94-2.06C9.46 2.35 8.78 2.03 8
    2H7V0L4 3l3 3V4h1c.27.02.48.11.69.31.21.2.3.42.31.69v6.28A1.993 1.993 0 0 0 10 15a1.993 1.993 0 0 0 1-
    3.72zm-1 2.92c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zM4 3c0-1.11-
    .89-2-2a1.993 1.993 0 0 0-1 3.72v6.56A1.993 1.993 0 0 0 2 15a1.993 1.993 0 0 0 1-3.72V4.72c.59-.34 1-.98 1-
    1.72zm-.8 10c0 .66-.55 1.2-1.2 1.2-.65 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2zM2 4.2C1.34 4.2.8
    3.65.8 3c0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
    <span itemprop="name">Pull requests</span>
    <span class="Counter">1</span>
    <meta itemprop="position" content="3">
  </a> </span>
```

```
<a href="/vt-middleware/cryptacular/projects" class="js-selected-navigation-item reponav-item" data-selected-
links="repo_projects new_repo_project repo_project /vt-middleware/cryptacular/projects">
  <svg aria-hidden="true" class="octicon octicon-project" height="16" version="1.1" viewBox="0 0 15 16"
  width="15"><path fill-rule="evenodd" d="M10 12h3V2h-3v10zm-4 2h3V2H6v8zm-4 4h3V2H2v12zm-1
  1h13V1H1v14zM14 0H1a1 1 0 0 0-1 1v14a1 1 0 0 0 1 1h13a1 1 0 0 0 1-1V1a1 1 0 0 0-1-1z"/></svg>
  Projects
  <span class="Counter" >0</span>
</a>
```

```
<div class="reponav-dropdown js-menu-container">
  <button type="button" class="btn-link reponav-item reponav-dropdown js-menu-target " data-no-toggle aria-
  expanded="false" aria-haspopup="true">
    Insights
    <svg aria-hidden="true" class="octicon octicon-triangle-down v-align-middle text-gray" height="11"
    version="1.1" viewBox="0 0 12 16" width="8"><path fill-rule="evenodd" d="M0 5l6 6-6-6z"/></svg>
  </button>
  <div class="dropdown-menu-content js-menu-content">
    <div class="dropdown-menu dropdown-menu-sw">
      <a class="dropdown-item" href="/vt-middleware/cryptacular/pulse" data-skip-pjax>
        <svg aria-hidden="true" class="octicon octicon-pulse" height="16" version="1.1" viewBox="0 0 14 16"
        width="14"><path fill-rule="evenodd" d="M11.5 8L8.8 5.4 6.6 8.5 5.5 1.6 2.38 8H0v2h3.6l9-1.8.9 5.4L9 8.511.6
        1.5H14V8z"/></svg>
        Pulse
      </a>
      <a class="dropdown-item" href="/vt-middleware/cryptacular/graphs" data-skip-pjax>
        <svg aria-hidden="true" class="octicon octicon-graph" height="16" version="1.1" viewBox="0 0 16 16"
        width="16"><path fill-rule="evenodd" d="M16 14v1H0V0h1v14h15zM5 13H3V8h2v5zm4 0H7V3h2v10zm4 0h-
        2V6h2v7z"/></svg>
        Graphs
      </a>
    </div>
  </div>
```

```

    </div>
  </div>
</div>
</nav>

  </div>
</div>

<div class="container new-discussion-timeline experiment-repo-nav">
  <div class="repository-content">

    <a href="/vt-middleware/cryptacular/blob/c26911e3cd28497ce9daa3ce682e09cb2d1d8688/NOTICE" class="d-
none js-permalink-shortcut" data-hotkey="y">Permalink</a>

    <!-- blob contrib key: blob_contributors:v21:f5054b9e46039e0ad937c69e6151b7d4 -->

    <div class="file-navigation js-zeroclipboard-container">

    <div class="select-menu branch-select-menu js-menu-container js-select-menu float-left">
    <button class=" btn btn-sm select-menu-button js-menu-target css-truncate" data-hotkey="w"

      type="button" aria-label="Switch branches or tags" aria-expanded="false" aria-haspopup="true">
        <i>Branch:</i>
        <span class="js-select-button css-truncate-target">master</span>
    </button>

    <div class="select-menu-modal-holder js-menu-content js-navigation-container" data-pjax>

      <div class="select-menu-modal">
        <div class="select-menu-header">
          <svg aria-label="Close" class="octicon octicon-x js-menu-close" height="16" role="img" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M7.48 8l3.75-3.75-1.48 1.48L6 9.48l-3.75 3.75-
1.48-1.48L4.52 8 .77 4.25l1.48-1.48L6 5.52l3.75-3.75 1.48 1.48z"/></svg>
          <span class="select-menu-title">Switch branches/tags</span>
        </div>

        <div class="select-menu-filters">
          <div class="select-menu-text-filter">
            <input type="text" aria-label="Filter branches/tags" id="context-commitish-filter-field" class="form-control
js-filterable-field js-navigation-enable" placeholder="Filter branches/tags">
          </div>
          <div class="select-menu-tabs">
            <ul>
              <li class="select-menu-tab">
                <a href="#" data-tab-filter="branches" data-filter-placeholder="Filter branches/tags" class="js-select-menu-
tab" role="tab">Branches</a>
              </li>

```

```

    <li class="select-menu-tab">
      <a href="#" data-tab-filter="tags" data-filter-placeholder="Find a tag" class="js-select-menu-tab"
role="tab">Tags</a>
    </li>
  </ul>
</div>
</div>

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="branches"
role="menu">

  <div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/blob/ISSUE-31+32/NOTICE"
      data-name="ISSUE-31+32"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        ISSUE-31+32
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "
      href="/vt-middleware/cryptacular/blob/gh-pages/NOTICE"
      data-name="gh-pages"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        gh-pages
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open selected"
      href="/vt-middleware/cryptacular/blob/master/NOTICE"
      data-name="master"
      data-skip-pjax="true"
      rel="nofollow">
      <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
      <span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
        master
      </span>
    </a>

    <a class="select-menu-item js-navigation-item js-navigation-open "

```



```

href="/vt-middleware/cryptacular/blob/v1.1/NOTICE"
data-name="v1.1"
data-skip-pjax="true"
rel="nofollow">
<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
<span class="select-menu-item-text css-truncate-target js-select-menu-filter-text">
v1.1
</span>
</a>
</div>

```

```

<div class="select-menu-no-results">Nothing to show</div>
</div>

```

```

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="tags">
<div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

```

```

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.2.1/NOTICE"
data-name="v1.2.1"
data-skip-pjax="true"
rel="nofollow">
<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
<span class="select-menu-item-text css-truncate-target" title="v1.2.1">
v1.2.1
</span>
</a>

```

```

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.2.0/NOTICE"
data-name="v1.2.0"
data-skip-pjax="true"
rel="nofollow">
<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
<span class="select-menu-item-text css-truncate-target" title="v1.2.0">
v1.2.0
</span>
</a>

```

```

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.2/NOTICE"
data-name="v1.1.2"
data-skip-pjax="true"
rel="nofollow">
<svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

```

```

    <span class="select-menu-item-text css-truncate-target" title="v1.1.2">
      v1.1.2
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.1.1/NOTICE"
    data-name="v1.1.1"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.1.1">
      v1.1.1
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.1.0/NOTICE"
    data-name="v1.1.0"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.1.0">
      v1.1.0
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0/NOTICE"
    data-name="v1.0"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0">
      v1.0
    </span>
  </a>
  <a class="select-menu-item js-navigation-item js-navigation-open "
    href="/vt-middleware/cryptacular/tree/v1.0-RC6/NOTICE"
    data-name="v1.0-RC6"
    data-skip-pjax="true"
    rel="nofollow">
    <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
    <span class="select-menu-item-text css-truncate-target" title="v1.0-RC6">
      v1.0-RC6
    </span>
  </a>

```

```

<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC4/NOTICE"
  data-name="v1.0-RC4"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC4">
    v1.0-RC4
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC3/NOTICE"
  data-name="v1.0-RC3"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC3">
    v1.0-RC3
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC2/NOTICE"
  data-name="v1.0-RC2"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC2">
    v1.0-RC2
  </span>
</a>
<a class="select-menu-item js-navigation-item js-navigation-open "
  href="/vt-middleware/cryptacular/tree/v1.0-RC1/NOTICE"
  data-name="v1.0-RC1"
  data-skip-pjax="true"
  rel="nofollow">
  <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>
  <span class="select-menu-item-text css-truncate-target" title="v1.0-RC1">
    v1.0-RC1
  </span>
</a>
</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

```

```

</div>
</div>
</div>

<div class="BtnGroup float-right">
  <a href="/vt-middlewre/cryptacular/find/master"
    class="js-pjax-capture-input btn btn-sm BtnGroup-item"
    data-pjax
    data-hotkey="t">
    Find file
  </a>
  <button aria-label="Copy file path to clipboard" class="js-zeroclipboard btn btn-sm BtnGroup-item tooltiped
  tooltiped-s" data-copied-hint="Copied!" type="button">Copy path</button>
</div>
<div class="breadcrumb js-zeroclipboard-target">
  <span class="repo-root js-repo-root"><span class="js-path-segment"><a href="/vt-
  middlewre/cryptacular"><span>cryptacular</span></a></span></span><span class="separator"></span><strong
  class="final-path">NOTICE</strong>
</div>
</div>

<div class="commit-tease">
  <span class="float-right">
    <a class="commit-tease-sha" href="/vt-
  middlewre/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1" data-pjax>
      6dd6f19
    </a>
    <relative-time datetime="2017-07-06T22:28:36Z">Jul 7, 2017</relative-time>
  </span>
  <div>
    
    <a href="/dfish3r" class="user-mention" rel="contributor">dfish3r</a>
    <a href="/vt-middlewre/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1"
  class="message" data-pjax="true" title="Update year in notice.">Update year in notice.</a>
  </div>

  <div class="commit-tease-contributors">
    <button type="button" class="btn-link muted-link contributors-toggle" data-facebox="#blob_contributors_box">
      <strong>1</strong>
      contributor
    </button>

  </div>

```

```
<div id="blob_contributors_box" style="display:none">
  <h2 class="facebox-header" data-facebox-id="facebox-header">Users who have contributed to this file</h2>
  <ul class="facebox-user-list" data-facebox-id="facebox-description">
    <li class="facebox-user-list-item">
      
      <a href="/dfish3r">dfish3r</a>
    </li>
  </ul>
</div>
</div>
```

```
<div class="file">
  <div class="file-header">
  <div class="file-actions">

  <div class="BtnGroup">
    <a href="/vt-middleware/cryptacular/raw/master/NOTICE" class="btn btn-sm BtnGroup-item" id="raw-
url">Raw</a>
    <a href="/vt-middleware/cryptacular/blame/master/NOTICE" class="btn btn-sm js-update-url-with-hash
BtnGroup-item" data-hotkey="b">Blame</a>
    <a href="/vt-middleware/cryptacular/commits/master/NOTICE" class="btn btn-sm BtnGroup-item"
rel="nofollow">History</a>
  </div>
```

```
<button type="button" class="btn-octicon disabled tooltiped tooltiped-nw"
  aria-label="You must be signed in to make or propose changes">
  <svg aria-hidden="true" class="octicon octicon-pencil" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M0 12v3h3l8-8-3-3-8 8zm3 2H1v-2h1v1h1v1zm10.3-9.3L12 6 9 3l1.3-
1.3a.996.996 0 0 1 1.41 0l1.59 1.59c.39.39.39 1.02 0 1.41z"/></svg>
</button>
<button type="button" class="btn-octicon btn-octicon-danger disabled tooltiped tooltiped-nw"
  aria-label="You must be signed in to make or propose changes">
  <svg aria-hidden="true" class="octicon octicon-trashcan" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M11 2H9c0-.55-.45-1-1-1H5c-.55 0-1 .45-1 1H2c-.55 0-1 .45-1 1v1c0
.55.45 1 1 1v9c0 .55.45 1 1 1h7c.55 0 1-.45 1-1V5c.55 0 1-.45 1-1V3c0-.55-.45-1-1-1zm-1
12H3V5h1v8h1V5h1v8h1V5h1v9zm1-10H2V3h9v1z"/></svg>
</button>
</div>
```

```
<div class="file-info">
  7 lines (5 sloc)
  <span class="file-info-divider"></span>
  165 Bytes
</div>
</div>
```

```

<div itemprop="text" class="blob-wrapper data type-text">
  <table class="highlight tab-size js-file-line-container" data-tab-size="8">
    <tr>
      <td id="L1" class="blob-num js-line-number" data-line-number="1"></td>
      <td id="LC1" class="blob-code blob-code-inner js-file-line">Cryptacular Java Library</td>
    </tr>
    <tr>
      <td id="L2" class="blob-num js-line-number" data-line-number="2"></td>
      <td id="LC2" class="blob-code blob-code-inner js-file-line">Copyright (C) 2003-2017 Virginia Tech.</td>
    </tr>
    <tr>
      <td id="L3" class="blob-num js-line-number" data-line-number="3"></td>
      <td id="LC3" class="blob-code blob-code-inner js-file-line">All rights reserved.</td>
    </tr>
    <tr>
      <td id="L4" class="blob-num js-line-number" data-line-number="4"></td>
      <td id="LC4" class="blob-code blob-code-inner js-file-line">
</td>
    </tr>
    <tr>
      <td id="L5" class="blob-num js-line-number" data-line-number="5"></td>
      <td id="LC5" class="blob-code blob-code-inner js-file-line">This product includes software developed at</td>
    </tr>
    <tr>
      <td id="L6" class="blob-num js-line-number" data-line-number="6"></td>
      <td id="LC6" class="blob-code blob-code-inner js-file-line">Virginia Tech (http://www.vt.edu).</td>
    </tr>
  </table>

</div>

</div>

<button type="button" data-facebox="#jump-to-line" data-facebox-class="linejump" data-hotkey="l" class="d-
none">Jump to Line</button>
<div id="jump-to-line" style="display:none">
  <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="" class="js-jump-
to-line-form" method="get"><div style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden"
value="&#x2713;" /></div>
  <input class="form-control linejump-input js-jump-to-line-field" type="text" placeholder="Jump to line&hellip;"
aria-label="Jump to line" autofocus>
  <button type="submit" class="btn">Go</button>
</form> </div>

</div>

```

```

<div class="modal-backdrop js-touch-events"></div>
</div>

</div>
</div>

</div>

<div class="container site-footer-container">
<div class="site-footer " role="contentinfo">
<ul class="site-footer-links float-right">
<li><a href="https://github.com/contact" data-ga-click="Footer, go to contact, text:contact">Contact
GitHub</a></li>
<li><a href="https://developer.github.com" data-ga-click="Footer, go to api, text:api">API</a></li>
<li><a href="https://training.github.com" data-ga-click="Footer, go to training, text:training">Training</a></li>
<li><a href="https://shop.github.com" data-ga-click="Footer, go to shop, text:shop">Shop</a></li>
<li><a href="https://github.com/blog" data-ga-click="Footer, go to blog, text:blog">Blog</a></li>
<li><a href="https://github.com/about" data-ga-click="Footer, go to about, text:about">About</a></li>
</ul>

<a href="https://github.com" aria-label="Homepage" class="site-footer-mark" title="GitHub">
<svg aria-hidden="true" class="octicon octicon-mark-github" height="24" version="1.1" viewBox="0 0 16 16"
width="24"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59 4.07 5.55-17.55-.38 0-
.19-.01-.82-.01-1.49-2.01-3.7-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53 6.3-.01 1.08 5.8
1.23 8.27 1.21 1.87 8.7 2.33 6.6 07-.52 2.8-.87 5.1-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87 3.1-1.59 8.2-2.15-.08-.2-.36-
1.02 08-2.12 0 0 .67-.21 2.2 82.64-.18 1.32-.27 2-.27 68 0 1.36 09 2 .27 1.53-1.04 2.2-.82 2.2-.82 44 1.1 16 1.92 08
2.12 51 56 82 1.27 82 2.15 0 3.07-1.87 3.75-3.65 3.95 29 25 54 73 54 1.48 0 1.07-.01 1.93-.01 2 2 0
.21 15 46 55 38 8 0 13 8 0 13 0 0 0 16 8c0-4.42-3.58-8-8-8z"/></svg>
</a>
<ul class="site-footer-links">
<li>&copy; 2017 <span title="0.10938s from unicorn-2925809464-f2ltq">GitHub</span>, Inc.</li>
<li><a href="https://github.com/site/terms" data-ga-click="Footer, go to terms, text:terms">Terms</a></li>
<li><a href="https://github.com/site/privacy" data-ga-click="Footer, go to privacy,
text:privacy">Privacy</a></li>
<li><a href="https://github.com/security" data-ga-click="Footer, go to security,
text:security">Security</a></li>
<li><a href="https://status.github.com/" data-ga-click="Footer, go to status, text:status">Status</a></li>
<li><a href="https://help.github.com" data-ga-click="Footer, go to help, text:help">Help</a></li>
</ul>
</div>
</div>

<div id="ajax-error-message" class="ajax-error-message flash flash-error">
<svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"

```

```
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52z" data-bbox="147 48 942 100"/>  
<button type="button" class="flash-close js-flash-close js-ajax-error-dismiss" aria-label="Dismiss error">  
  <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"  
width="12"><path fill-rule="evenodd" d="M7.48 8.13.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77  
4.25 11.48-1.48L6 6.52l3.75-3.75 1.48 1.48z" data-bbox="147 110 942 160"/>  
</button>  
  You can't perform that action at this time.  
</div>
```

```
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/compat-  
91f98c37fc84eac24836eec2567e9912742094369a04c4eba6e3cd1fa18902d9.js"></script>  
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/frameworks-  
f84bb87b149685d1e6c6f057ee324f2cd496e677f5a359a8b5db853313bb83e6.js"></script>
```

```
<script async="async" crossorigin="anonymous" src="https://assets-cdn.github.com/assets/github-  
13fa3aa50ac8f9fa9a7d198f0cd13b0905775d39446ad076d17d8f74a998438a.js"></script>
```

```
<div class="js-stale-session-flash stale-session-flash flash flash-warn flash-banner d-none">  
  <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"  
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52z" data-bbox="147 457 942 540"/>  
  <span class="signed-in-tab-flash">You signed in with another tab or window. <a href="">Reload</a> to refresh  
your session.</span>  
  <span class="signed-out-tab-flash">You signed out in another tab or window. <a href="">Reload</a> to refresh  
your session.</span>  
</div>
```

```
<div class="facebox" id="facebox" style="display:none;">  
<div class="facebox-popup">  
  <div class="facebox-content" role="dialog" aria-labelledby="facebox-header" aria-describedby="facebox-  
description">  
    </div>  
    <button type="button" class="facebox-close js-facebox-close" aria-label="Close modal">  
      <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"  
width="12"><path fill-rule="evenodd" d="M7.48 8.13.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77  
4.25 11.48-1.48L6 6.52l3.75-3.75 1.48 1.48z" data-bbox="147 740 918 790"/>  
    </button>  
  </div>  
</div>
```

```
</body>
```



```

</html>
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.action.get.GetAction;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.permission.Role;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import org.junit.Before;

import java.util.function.Predicate;

import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.MONITOR;
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.READ;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

public class PermissionTests extends ESTestCase {
    private Role permission;

    @Before
    public void init() {
        Role.Builder builder = Role.builder("test");
        builder.add(MONITOR, "test_*", "/foo.*/*");
        builder.add(READ, "baz_*foo", "/fool.*bar/*");
        builder.add(MONITOR, "/bar.*/*");
        permission = builder.build();
    }

    public void testAllowedIndicesMatcherAction() throws Exception {
        testAllowedIndicesMatcher(permission.indices().allowedIndicesMatcher(GetAction.NAME));
    }

    public void testAllowedIndicesMatcherActionCaching() throws Exception {
        Predicate<String> matcher1 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        Predicate<String> matcher2 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
        assertThat(matcher1, is(matcher2));
    }

    public void testBuildEmptyRole() {
        Role.Builder permission = Role.builder(new String[] { "some_role" });
        Role role = permission.build();
        assertThat(role, notNullValue());
        assertThat(role.cluster(), notNullValue());
    }
}

```

```

    assertThat(role.indices(), notNullValue());
    assertThat(role.runAs(), notNullValue());
}

public void testRunAs() {
    Role permission = Role.builder("some_role")
        .runAs(new Privilege("name", "user1", "run*"))
        .build();
    assertThat(permission.runAs().check("user1"), is(true));
    assertThat(permission.runAs().check("user"), is(false));
    assertThat(permission.runAs().check("run" + randomAlphaOfLengthBetween(1, 10)), is(true));
}

// "baz_*foo", "/fool.*bar/"
private void testAllowedIndicesMatcher(Predicate<String> indicesMatcher) {
    assertThat(indicesMatcher.test("foobar"), is(false));
    assertThat(indicesMatcher.test("fool"), is(false));
    assertThat(indicesMatcher.test("fool2bar"), is(true));
    assertThat(indicesMatcher.test("baz_foo"), is(true));
    assertThat(indicesMatcher.test("barbapapa"), is(false));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissions;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReferenceArray;

import static org.hamcrest.Matchers.containsString;

public class FieldPermissionsTests extends ESTestCase {

```

```

public void testParseFieldPermissions() throws Exception {
    String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": { \" +
        \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"], \" +
        \"except\": [\"f3\", \"f4\"] \" +
        \"}}}]";
    RoleDescriptor rd =
        RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[] { "f1", "f2", "f3", "f4" });
    assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
        new String[] { "f3", "f4" });

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": { \" +
        \"except\": [\"f3\", \"f4\"], \" +
        \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"] \" +
        \"}}}]";
    rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[] { "f1", "f2", "f3", "f4" });
    assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
        new String[] { "f3", "f4" });

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": { \" +
        \"grant\": [\"f1\", \"f2\"] \" +
        \"}}}]";
    rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[] { "f1", "f2" });
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": { \" +
        \"grant\": [] \" +
        \"}}}]";
    rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": { \" +
        \"except\": [], \" +
        \"grant\": [] \" +
        \"}}}]";
    rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
}

```

```

assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(), new String[] {});

final String exceptWithoutGrant = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"]p3\", \"field_security\": {\" +
    \"except\": [\"f1\"]\" +
    \"}}]}";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptWithoutGrant), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),
    containsString("failed to parse indices privileges for role [test]. field_security"
        + " requires grant if except is given"));

final String grantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\",\" +
    \"field_security\": {\" +
    \"grant\": null\" +
    \"}}]}";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(grantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for" +
    " role [test]. grant must not be null."));

final String exceptNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"]p3\", \"field_security\": {\" +
    \"grant\": [\"*\"]\",\" +
    \"except\": null\" +
    \"}}]}";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(),
    containsString("failed to parse indices privileges for role [test]. except must" +
        " not be null."));

final String exceptGrantNull = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"]p3\", \"field_security\": {\" +
    \"grant\": null,\" +
    \"except\": null\" +
    \"}}]}";
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(exceptGrantNull), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
    "for role [test]. grant must not be null."));

final String bothFieldsMissing = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": \" +
    \"[\"]p3\", \"field_security\": {\" +

```

```

    }}}}";
    e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(bothFieldsMissing), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
        "for role [test]. \"field_security\" must not be empty."));

    // try with two indices and mix order a little
    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"field_security\": {\" +
        \"grant\": []\" +
        }},\" +
        {\"names\": \"idx3\", \"n\" +
        \"field_security\": {\"n\" +
        \"grant\": [\"*\"]\", \"n\" +
        \"except\": [\"f2\"]},\" +
        \"privileges\": [\"p3\"]}}]";
    rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
    assertEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"*"});
    assertEquals(rd.getIndicesPrivileges()[1].getDeniedFields(), new String[] {"f2"});
}

// test old syntax for field permissions
public void testBWCFIELDPermissions() throws Exception {
    String q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": [\"f1\", \"f2\"]\" +
        }]}";
    RoleDescriptor rd = RoleDescriptor.parse("test", new ByteArray(q), true,
        XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
        new String[]{"f1", "f2"});
    assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

    final String failingQuery = q;
    ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
        () -> RoleDescriptor.parse("test", new ByteArray(failingQuery), false,
            XContentType.JSON));
    assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
        \"changed for field permissions in role [test]\" +
        \", use [\"field_security\": {\"grant\": [...], \"except\": [...]}] instead"));

    q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
        \"fields\": []\" +
        }]}";
    rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
    assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
}

```

```

assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery2 = q;
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(failingQuery2), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has " +
    "changed for field permissions in role [test]" +
    ", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

q = "{\"indices\": [ {\"names\": \"idx2\", \"privileges\": [\"p3\"], " +
    "\"fields\": null" +
    "}] }";
rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
assertNull(rd.getIndicesPrivileges()[0].getGrantedFields());
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery3 = q;
e = expectThrows(ElasticsearchParseException.class,
    () -> RoleDescriptor.parse("test", new ByteArray(failingQuery3), false,
        XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has " +
    "changed for field permissions in role [test]" +
    ", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));
}

public void testFieldPermissionsHashCodeThreadSafe() throws Exception {
    final int numThreads = scaledRandomIntBetween(4, 16);
    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "*" }, new String[] { "foo" }));
    final CountdownLatch latch = new CountdownLatch(numThreads + 1);
    final AtomicReferenceArray<Integer> hashCodes = new AtomicReferenceArray<>(numThreads);
    List<Thread> threads = new ArrayList<>(numThreads);
    for (int i = 0; i < numThreads; i++) {
        final int threadNum = i;
        threads.add(new Thread(() -> {
            latch.countDown();
            try {
                latch.await();
            } catch (InterruptedException e) {
                Thread.currentThread().interrupt();
            }
            final int hashCode = fieldPermissions.hashCode();
            hashCodes.set(threadNum, hashCode);
        }));
    }

    for (Thread thread : threads) {
        thread.start();
    }
}

```

```

    latch.countDown();
    for (Thread thread : threads) {
        thread.join();
    }

    final int hashCode = fieldPermissions.hashCode();
    for (int i = 0; i < numThreads; i++) {
        assertEquals((Integer) hashCode, hashCodes.get(i));
    }
}

public void testAllFieldIsAutomaticallyExcludedIfNotExplicitlyGranted() throws Exception {
    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(new String[] { "_a*" }, new String[0]));
    assertTrue(fieldPermissions.grantsAccessTo("_animal"));
    assertFalse(fieldPermissions.grantsAccessTo("_all"));
}

public void testAllFieldIsNotExcludedIfExplicitlyGranted() throws Exception {
    final String[] grant = { "foo", "bar", "baz", "_all" };
    Collections.shuffle(Arrays.asList(grant), random());

    final FieldPermissions fieldPermissions = new FieldPermissions(
        new FieldPermissionsDefinition(grant, new String[0]));

    assertTrue(fieldPermissions.grantsAccessTo("_all"));
    assertTrue(fieldPermissions.grantsAccessTo("foo"));
    assertTrue(fieldPermissions.grantsAccessTo("bar"));
    assertTrue(fieldPermissions.grantsAccessTo("baz"));
    assertFalse(fieldPermissions.grantsAccessTo(randomAlphaOfLengthBetween(5, 8)));
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.http.message.BasicHeader;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.DocWriteResponse;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.stats.NodesStatsResponse;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsIndices;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsResponse;
import org.elasticsearch.action.admin.indices.stats.IndicesStatsResponse;
import org.elasticsearch.action.index.IndexResponse;

```

```

import org.elasticsearch.client.Client;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.transport.NoNodeAvailableException;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.routing.ShardRoutingState;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.SecureString;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.util.concurrent.ThreadContext;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.SecurityIntegTestCase;
import org.elasticsearch.test.SecuritySettingsSource;
import org.elasticsearch.test.SecuritySettingsSourceField;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.security.SecurityField;
import org.elasticsearch.xpack.core.security.action.user.GetUsersResponse;
import org.elasticsearch.xpack.core.security.authc.support.UsernamePasswordToken;
import org.elasticsearch.xpack.core.security.client.SecurityClient;
import org.elasticsearch.xpack.security.LocalStateSecurity;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertNoFailures;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.greaterThanOrEqualTo;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

@TestLogging("org.elasticsearch.cluster.service:TRACE,org.elasticsearch.discovery.zen:TRACE,org.elasticsearch.
action.search:TRACE," +

```



```

"org.elasticsearch.search:TRACE")
public class LicensingTests extends SecurityIntegTestCase {
    public static final String ROLES =
        SecuritySettingsSource.TEST_ROLE + "\n" +
            " cluster: [ all ]\n" +
            " indices:\n" +
            "   - names: *\n" +
            "     privileges: [manage]\n" +
            "   - names: '*/'\n" +
            "     privileges: [write]\n" +
            "   - names: 'test'\n" +
            "     privileges: [read]\n" +
            "   - names: 'test1'\n" +
            "     privileges: [read]\n" +
            "\n" +
            "role_a:\n" +
            " indices:\n" +
            "   - names: 'a'\n" +
            "     privileges: [all]\n" +
            "\n" +
            "role_b:\n" +
            " indices:\n" +
            "   - names: 'b'\n" +
            "     privileges: [all]\n";

    public static final String USERS =
        SecuritySettingsSource.CONFIG_STANDARD_USER +
            "user_a:{plain}passwd\n" +
            "user_b:{plain}passwd\n";

    public static final String USERS_ROLES =
        SecuritySettingsSource.CONFIG_STANDARD_USER_ROLES +
            "role_a:user_a,user_b\n" +
            "role_b:user_b\n";

    @Override
    protected String configRoles() {
        return ROLES;
    }

    @Override
    protected String configUsers() {
        return USERS;
    }

    @Override
    protected String configUsersRoles() {
        return USERS_ROLES;
    }
}

```

```

}

@Override
public Settings nodeSettings(int nodeOrdinal) {
    return Settings.builder().put(super.nodeSettings(nodeOrdinal))
        .put(NetworkModule.HTTP_ENABLED.getKey(), true)
        .put(TestZenDiscovery.USE MOCK_PINGS.getKey(), false)
        .build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
    ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
    plugins.add(Netty4Plugin.class); // for http
    return plugins;
}

@Override
protected int maxNumberOfNodes() {
    return super.maxNumberOfNodes() + 1;
}

@Before
public void resetLicensing() {
    enableLicensing();
}

@After
public void cleanupSecurityIndex() {
    deleteSecurityIndex();
}

public void testEnableDisableBehaviour() throws Exception {
    IndexResponse indexResponse = index("test", "type", jsonBuilder()
        .startObject()
        .field("name", "value")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    indexResponse = index("test1", "type", jsonBuilder()
        .startObject()
        .field("name", "value1")
        .endObject());
    assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

    refresh();
    // wait for all replicas to be started (to make sure that there are no more cluster state updates when we disable

```

licensing)

```
assertBusy(() -> assertTrue(client().admin().cluster().prepareState().get().getState().routingTable()
    .shardsWithState(ShardRoutingState.INITIALIZING).isEmpty()));
```

```
Client client = internalCluster().transportClient();
```

```
disableLicensing();
```

```
assertElasticsearchSecurityException(() -> client.admin().indices().prepareStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareClusterStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareHealth().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareNodesStats().get());
```

```
enableLicensing(randomFrom(License.OperationMode.values()));
```

```
IndicesStatsResponse indicesStatsResponse = client.admin().indices().prepareStats().get();
assertNoFailures(indicesStatsResponse);
```

```
ClusterStatsResponse clusterStatsNodeResponse = client.admin().cluster().prepareClusterStats().get();
assertThat(clusterStatsNodeResponse, notNullValue());
ClusterStatsIndices indices = clusterStatsNodeResponse.getIndicesStats();
assertThat(indices, notNullValue());
assertThat(indices.getIndexCount(), greaterThanOrEqualTo(2));
```

```
ClusterHealthResponse clusterIndexHealth = client.admin().cluster().prepareHealth().get();
assertThat(clusterIndexHealth, notNullValue());
```

```
NodesStatsResponse nodeStats = client.admin().cluster().prepareNodesStats().get();
assertThat(nodeStats, notNullValue());
```

```
}
```

```
public void testRestAuthenticationByLicenseType() throws Exception {
    Response response = getRestClient().performRequest("GET", "/");
    // the default of the licensing tests is basic
    assertThat(response.getStatusLine().getStatusCode(), is(200));
    ResponseException e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(403));

    // generate a new license with a mode that enables auth
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    e = expectThrows(ResponseException.class, () -> getRestClient().performRequest("GET", "/"));
    assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));
    e = expectThrows(ResponseException.class,
        () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
}
```

```

assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));

final String basicAuthValue =
UsernamePasswordToken.basicAuthHeaderValue(SecuritySettingsSource.TEST_USER_NAME,
    new SecureString(SecuritySettingsSourceField.TEST_PASSWORD.toCharArray()));
response = getRestClient().performRequest("GET", "/", new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));
response = getRestClient().performRequest("GET", "/_xpack/security/_authenticate",
    new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));

}

public void testSecurityActionsByLicenseType() throws Exception {
    // security actions should not work!
    Settings settings = internalCluster().transportClient().settings();
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        new SecurityClient(client).prepareGetUsers().get();
        fail("security actions should not be enabled!");
    } catch (ElasticsearchSecurityException e) {
        assertThat(e.status(), is(RestStatus.FORBIDDEN));
        assertThat(e.getMessage(), containsString("non-compliant"));
    }

    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    // security actions should not work!
    try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
        GetUsersResponse response = new SecurityClient(client).prepareGetUsers().get();
        assertNotNull(response);
    }
}

public void testTransportClientAuthenticationByLicenseType() throws Exception {
    Settings.Builder builder = Settings.builder()
        .put(internalCluster().transportClient().settings());
    // remove user info
    builder.remove(SecurityField.USER_SETTING.getKey());
    builder.remove(ThreadContext.PREFIX + "." + UsernamePasswordToken.BASIC_AUTH_HEADER);

    // basic has no auth

```

```

    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
    ());
        assertGreenClusterState(client);
    }

    // enable a license that enables security
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
        License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);

    try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
    client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
    ());
        client.admin().cluster().prepareHealth().get();
        fail("should not have been able to connect to a node!");
    } catch (NoNodeAvailableException e) {
        // expected
    }
}

public void testNodeJoinWithoutSecurityExplicitlyEnabled() throws Exception {
    License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
    enableLicensing(mode);
    ensureGreen();

    Path home = createTempDir();
    Path conf = home.resolve("config");
    Files.createDirectories(conf);
    Settings nodeSettings = Settings.builder()
        .put(nodeSettings(maxNumberOfNodes() - 1).filter(s -> "xpack.security.enabled".equals(s) == false))
        .put("node.name", "my-test-node")
        .put("network.host", "localhost")
        .put("cluster.name", internalCluster().getClusterName())
        .put("discovery.zen.minimum_master_nodes",
            internalCluster().getInstance(Settings.class).get("discovery.zen.minimum_master_nodes"))
        .put("path.home", home)
        .put(TestZenDiscovery.USE MOCK PINGS.getKey(), false)
        .put(DiscoveryModule.DISCOVERY_TYPE_SETTING.getKey(), "test-zen")
        .put(DiscoveryModule.DISCOVERY_HOSTS_PROVIDER_SETTING.getKey(), "test-zen")
        .build();
    Collection<Class<? extends Plugin>> mockPlugins = Arrays.asList(LocalStateSecurity.class,
TestZenDiscovery.TestPlugin.class);
    try (Node node = new MockNode(nodeSettings, mockPlugins)) {
        node.start();
        ensureStableCluster(cluster().size() + 1);
    }
}

```

```

    }
}

private static void assertElasticsearchSecurityException(ThrowingRunnable runnable) {
    ElasticsearchSecurityException ee = expectThrows(ElasticsearchSecurityException.class, runnable);
    assertThat(ee.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.SECURITY));
    assertThat(ee.status(), is(RestStatus.FORBIDDEN));
}

public static void disableLicensing() {
    disableLicensing(License.OperationMode.BASIC);
}

public static void disableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, false, null);
    }
}

public static void enableLicensing() {
    enableLicensing(License.OperationMode.BASIC);
}

public static void enableLicensing(License.OperationMode operationMode) {
    for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
        licenseState.update(operationMode, true, null);
    }
}
}
}

```

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[role="xpack"]

[testenv="basic"]

[[delete-license]]

=== Delete License API

This API enables you to delete licensing information.

[float]

==== Request

`DELETE /_xpack/license`

[float]

==== Description

When your license expires, {xpack} operates in a degraded mode. For more
information, see {xpack-ref}/license-expiration.html[License Expiration].

[float]

==== Authorization

You must have `manage` cluster privileges to use this API.

For more information, see
{xpack-ref}/security-privileges.html[Security Privileges].

[float]
==== Examples

The following example queries the info API:

```
[source,js]
-----
DELETE _xpack/license
-----
// CONSOLE
// TEST[skip:license testing issues]
```

When the license is successfully deleted, the API returns the following response:

```
[source,js]
-----
{
  "acknowledged": true
}
-----
// NOTCONSOLE
[role="xpack"]
[testenv="basic"]
[[get-license]]
=== Get License API
```

This API enables you to retrieve licensing information.

[float]
==== Request

```
`GET /_xpack/license`
```

[float]
==== Description

This API returns information about the type of license, when it was issued, and when it expires, for example.

For more information about the different types of licenses, see
<https://www.elastic.co/subscriptions>.

[float]
==== Query Parameters

``local`::`

(boolean) Specifies whether to retrieve local information. The default value is ``false``, which means the information is retrieved from the master node.

[float]

==== Authorization

You must have ``monitor`` cluster privileges to use this API.

For more information, see

[{xpack-ref}/security-privileges.html](#)[Security Privileges].

[float]

==== Examples

The following example provides information about a basic license:

[source,js]

```
-----  
GET _xpack/license  
-----
```

```
// CONSOLE
```

[source,js]

```
-----  
{  
  "license" : {  
    "status" : "active",  
    "uid" : "cbff45e7-c553-41f7-ae4f-9205eabd80xx",  
    "type" : "basic",  
    "issue_date" : "2018-02-22T23:12:05.550Z",  
    "issue_date_in_millis" : 1519341125550,  
    "max_nodes" : 1000,  
    "issued_to" : "test",  
    "issuer" : "elasticsearch",  
    "start_date_in_millis" : -1  
  }  
}
```

```
-----  
// TESTRESPONSE[s/"cbff45e7-c553-41f7-ae4f-9205eabd80xx"/$body.license.uid/]
```

```
// TESTRESPONSE[s/"basic"/$body.license.type/]
```

```
// TESTRESPONSE[s/"2018-02-22T23:12:05.550Z"/$body.license.issue_date/]
```

```
// TESTRESPONSE[s/1519341125550/$body.license.issue_date_in_millis/]
```

```
// TESTRESPONSE[s/1000/$body.license.max_nodes/]
```

```
// TESTRESPONSE[s/"test"/$body.license.issued_to/]
```

```
// TESTRESPONSE[s/"elasticsearch"/$body.license.issuer/]
```

```
[role="xpack"]
[testenv="basic"]
[[update-license]]
=== Update License API
```

This API enables you to update your license.

```
[float]
===== Request
```

```
`PUT _xpack/license`
```

```
[float]
===== Description
```

You can update your license at runtime without shutting down your nodes. License updates take effect immediately. If the license you are installing does not support all of the features that were available with your previous license, however, you are notified in the response. You must then re-submit the API request with the ``acknowledge`` parameter set to ``true``.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

```
[float]
===== Query Parameters
```

```
`acknowledge`::
(boolean) Specifies whether you acknowledge the license changes. The default value is `false`.
```

```
[float]
===== Request Body
```

```
`licenses`::
(array) A sequence of one or more JSON documents containing the license information.
```

```
[float]
===== Authorization
```

If `{security}` is enabled, you need ``manage`` cluster privileges to install the license.

If `{security}` is enabled and you are installing a gold or platinum license, you must enable TLS on the transport networking layer before you install the license. See <<configuring-tls>>.

[float]

==== Examples

The following example updates to a basic license:

[source,js]

```
-----  
POST _xpack/license  
{  
  "licenses": [  
    {  
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",  
      "type": "basic",  
      "issue_date_in_millis": 1411948800000,  
      "expiry_date_in_millis": 1914278399999,  
      "max_nodes": 1,  
      "issued_to": "issuedTo",  
      "issuer": "issuer",  
      "signature": "xx"  
    }  
  ]  
}
```

```
-----  
// CONSOLE  
// TEST[skip:license testing issues]
```

NOTE: These values are invalid; you must substitute the appropriate content from your license file.

You can alternatively use a ``curl`` command, for example:

[source,js]

[source,shell]

```
-----  
curl -XPUT -u <user> 'http://<host>:<port>/_xpack/license' -H "Content-Type: application/json" -d @license.json  
-----
```

```
// NOTCONSOLE
```

On Windows machine, use the following command:

[source,shell]

```
-----  
gc .\license.json | Invoke-WebRequest -uri http://<host>:<port>/_xpack/license -Credential elastic -Method Put -  
ContentType "application/json"  
-----
```

In these examples,

- * ``<user>`` is a user ID with the appropriate authority.
- * ``<host>`` is the hostname of the {es} node (`localhost` if executing locally)
- * ``<port>`` is the http port (defaults to `9200`)
- * ``license.json`` is the license JSON file

NOTE: If your {es} node has SSL enabled on the HTTP interface, you must start your URL with `https://`

If you previously had a license with more features than the basic license, you receive the following response:

```
[source,js]
-----
{
  "acknowledged": false,
  "license_status": "valid",
  "acknowledge": {
    "message": """"This license update requires acknowledgement. To acknowledge the license, please read the
following messages and update the license again, this time with the "acknowledge=true" parameter:""",
    "watcher": [
      "Watcher will be disabled"
    ],
    "logstash": [
      "Logstash will no longer poll for centrally-managed pipelines"
    ],
    "security": [
      "The following X-Pack security functionality will be disabled: ..." ]
  }
}
-----
// NOTCONSOLE
```

To complete the update, you must re-submit the API request and set the `acknowledge` parameter to `true`. For example:

```
[source,js]
-----
POST _xpack/license?acknowledge=true
{
  "licenses": [
    {
      "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",
      "type": "basic",
      "issue_date_in_millis": 1411948800000,
      "expiry_date_in_millis": 1914278399999,
      "max_nodes": 1,
    }
  ]
}
```

```
"issued_to":"issuedTo",
"issuer":"issuer",
"signature":"xx"
}
]
}
```

```
-----
// CONSOLE
// TEST[skip:license testing issues]
```

Alternatively:

```
[source,sh]
```

```
-----
curl -XPUT -u elastic 'http://<host>:<port>/_xpack/license?acknowledge=true' -H "Content-Type: application/json"
-d @license.json
```

```
-----
// NOTCONSOLE
```

For more information about the features that are disabled when you downgrade your license, see [{ xpack-ref }/license-expiration.html](#)[License Expiration].

```
[role="xpack"]
```

```
[[license-settings]]
```

```
=== { xpack } License Settings
```

```
++++
```

```
<titleabbrev>License Settings</titleabbrev>
```

```
++++
```

You can configure this licensing setting in the `elasticsearch.yml` file.

For more information, see

[{ xpack-ref }/license-management.html](#)[{ xpack } License Management].

```
`xpack.license.self_generated.type`::
```

Set to `basic` (default) to enable basic { xpack } features. +

```
+
```

```
--
```

If set to `trial`, the self-generated license gives access only to all the features of a x-pack for 30 days. You can later downgrade the cluster to a basic license if needed.

```
--
```

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```
// -----  
// Transitive dependencies of this project determined from the  
// maven pom organized by organization.  
// -----
```

Apache Extras for Apache log4j.

From: 'an unknown organization'

- geronimo-jms_1.1_spec org.apache.geronimo.specs:geronimo-jms_1.1_spec:jar:1.0

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Overview

[YAML](<http://yaml.org>) is a data serialization format designed for human readability and interaction with scripting languages.

SnakeYAML is a YAML processor for the Java Virtual Machine.

SnakeYAML features

- * a **complete** [YAML 1.1 processor](<http://yaml.org/spec/1.1/current.html>). In particular, SnakeYAML can parse all examples from the specification.
- * Unicode support including UTF-8/UTF-16 input/output.
- * high-level API for serializing and deserializing native Java objects.
- * support for all types from the [YAML types repository](<http://yaml.org/type/index.html>).
- * relatively sensible error messages.

Info

- * [Changes](<https://bitbucket.org/asomov/snakeyaml/wiki/Changes>)
- * [Documentation](<https://bitbucket.org/asomov/snakeyaml/wiki/Documentation>)

Contribute

- * Mercurial DVCS is used to dance with the [source code](<https://bitbucket.org/asomov/snakeyaml/src>).
- * If you find a bug in SnakeYAML, please [file a bug report](<https://bitbucket.org/asomov/snakeyaml/issues?status=new&status=open>).
- * You may discuss SnakeYAML at [the mailing list](<http://groups.google.com/group/snakeyaml-core>).

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5.4 fluent-logger-ruby 0.5.1

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5.6 fluent-mixin-plaintextformatter 0.2.6

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5.7 fluent-plugin-elasticsearch 1.10.0

5.8 fluent-plugin-kafka 0.7.2

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5.9 fluent-plugin-mongo 0.7.12

5.10 fluent-plugin-rewrite-tag-filter 1.5.4

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5.11 fluent-plugin-s3 0.6.5

5.12 fluent-plugin-scribe 0.10.14

5.13 fluent-plugin-splunk-hec v1.0.1

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5.14 fluent-plugin-tail_path 0.1.0

5.14.1 Available under license :

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5.15 fluent-plugin-td 0.10.28

5.16 fluent-plugin-webhdfs 0.4.1

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5.17 fluentd 0.12.20

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5.18 fluentd-ui 0.4.2

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5.19 kafka 0.10.0.0

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5.20 kafka-connect-splunk v1.0.0

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jnr-posix,,<https://github.com/jnr/jnr-posix>,EPL-1.0|GPL-2.0|LGPL-2.1
jrubby-openssl,,<https://github.com/jruby/jruby-openssl>,EPL-1.0|GPL-2.0|LGPL-2.1
jrubby-readline,,<https://github.com/jruby/jruby-readline>,EPL-1.0|GPL-2.0|LGPL-2.1
psych,,<https://github.com/ruby/psych>,MIT
jay-yydebug,,<http://svn.codehaus.org/jruby/trunk/jay/yydebug>,EPL-1.0|GPL-2.0|LGPL-2.0
control.js,,MIT
dragdrop.js,,MIT
effect.js,,MIT
prototype.js,,MIT
asm,,<http://asm.objectweb.org/>,BSD
jline2,,<https://github.com/jline/jline2>,BSD
jzlib,,<https://www.jcraft.com/jzlib/>,BSD-3-Clause
rake,,<https://github.com/ruby/rake>,MIT
jcodings,,<http://github.com/jruby/jcodings>,MIT
joni,,<http://github.com/jruby/joni>,MIT
bouncycastle,,<http://www.bouncycastle.org/>,MIT
jnr-x86asm,,<https://github.com/jnr/jnr-x86asm>,MIT
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jnr-unixsocket,,<https://github.com/jnr/jnr-unixsocket>,Apache-2.0
joda-time,,<http://joda-time.sourceforge.net/>,Apache-2.0
maven,,<http://maven.apache.org/>,Apache-2.0
nailgun,,<http://martiansoftware.com/nailgun/>,Apache-2.0
options,,<https://github.com/headius/options>,Apache-2.0
snakeyaml,,<https://github.com/asomov/snakeyaml>,Apache-2.0
unsafe-fences,,<https://github.com/headius/unsafe-fences>,Apache-2.0
racc,,<https://github.com/tenderlove/racc>,Ruby
json-generator,,<https://github.com/flori/json>,Ruby
json-parser,,<https://github.com/flori/json>,Ruby

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Posted Date: April 20, 2018

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jnr-posix,,<https://github.com/jnr/jnr-posix>,EPL-1.0|GPL-2.0|LGPL-2.1

jruby-openssl,,<https://github.com/jruby/jruby-openssl>,EPL-1.0|GPL-2.0|LGPL-2.1

jruby-readline,,<https://github.com/jruby/jruby-readline>,EPL-1.0|GPL-2.0|LGPL-2.1

psych,,<https://github.com/ruby/psych>),MIT

jay-yydebug,,<http://svn.codehaus.org/jruby/trunk/jay/yydebug>,EPL-1.0|GPL-2.0|LGPL-2.0

control.js,,MIT

dragdrop.js,,MIT

effect.js,,MIT

prototype.js,,MIT

asm,,<http://asm.objectweb.org>,BSD

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jzlib,,<https://www.jcraft.com/jzlib/>,BSD-3-Clause
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jnr-ffi,,<https://github.com/jnr/jnr-ffi>,Apache-2.0
jnr-netdb,,<http://github.com/jnr/jnr-netdb>,Apache-2.0
jnr-unixsocket,,<https://github.com/jnr/jnr-unixsocket>,Apache-2.0
joda-time,,<http://joda-time.sourceforge.net>,Apache-2.0
maven,,<http://maven.apache.org/>,Apache-2.0
nailgun,,<http://martiansoftware.com/nailgun>,Apache-2.0
options,,<https://github.com/headius/options>,Apache-2.0
snakeyaml,,<https://github.com/asomov/snakeyaml>,Apache-2.0
unsafe-fences,,<https://github.com/headius/unsafe-fences>,Apache-2.0
racc,,<https://github.com/tenderlove/racc>,Ruby
json-generator,,<https://github.com/flori/json>,Ruby
json-parser,,<https://github.com/flori/json>,Ruby

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5.22 Lua 5.2

5.23 nginx 1.8.1

5.23.1 Available under license :

```
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 */
```

5.24 schemaregistry 4.0.1-1

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```
<HTML><HEAD><style>
table {
  border-collapse: collapse;
  width: 100%;
  font-family: sans-serif;
}
h1 {
  font-family: sans-serif;
}

th, td {
  text-align: left;
  padding: 8px;
}
thead td {
```

```

background-color: #333;
color: #fff;
font-weight: bold;
}

```

```
tr:nth-child(even){background-color: #f2f2f2}
```

```

th {
background-color: #000000;
color: white;
}

```

```

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2.0.txt">Apache 2.0</A><br></TD></TR>
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<TD><A HREF="http://commons.apache.org/compress/">commons-compress-
1.4.1</A></TD><TD>jar</TD><TD>1.4.1</TD><TD><A HREF="http://www.apache.org/licenses/LICENSE-
2.0.txt">Apache 2.0</A><br></TD></TR>
<TR>
<TD><A HREF="http://validator.hibernate.org">hibernate-validator-
5.1.2.Final</A></TD><TD>jar</TD><TD>5.1.2.Final</TD><TD><A
HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br></TD></TR>
<TR>
<TD>hk2-api-2.4.0-b25</TD><TD>jar</TD><TD>2.4.0-b25</TD><TD><A
HREF="https://glassfish.java.net/nonav/public/CDDL+GPL_1_1.html">link from artifact (META-
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<TR>
<TD><A HREF="http://java.net/projects/tiger-types/sources/svn/show/tags/tiger-types-1.4">hk2-utils-2.4.0-

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| | | | |
|-----|--|-----------|---|
| b25 | jar | 2.4.0-b25 | link from artifact (META-INF/MANIFEST.MF) |
| | | | |
| | jackson-annotations- | 2.5.0 | Apache 2.0 |
| | | | |
| | jackson-core- | 2.5.4 | Apache 2.0 |
| | | | |
| | jackson-core-asl-1.9.13 | jar | 1.9.13 |
| | | | Apache 2.0 |
| | | | |
| | jackson-databind- | 2.5.4 | Apache 2.0 |
| | | | |
| | jackson-mapper-asl-1.9.13 | jar | 1.9.13 |
| | | | Apache 2.0 |
| | | | |
| | javassist-3.18.1-GA | jar | 3.18.1-GA |
| | | | Apache 2.0 |
| | | | MPL 1.1 |
| | | | MPL 1.1 , http://www.gnu.org/licenses/lgpl-2.1.html , link from artifact (META-INF/maven/org.javassist/javassist/pom.xml) |
| | | | LGPL 2.1 |
| | | | |
| | javax.annotation-api- | 1.2 | link from artifact (META-INF/maven/javax.annotation/javax.annotation-api/pom.xml) |
| | | | CDDL + GPLv2 with classpath exception |
| | | | |
| | javax.el-2.2.4 | jar | 2.2.4 |
| | | | link from artifact (META-INF/maven/org.glassfish.web/javax.el/pom.xml) |
| | | | CDDL + GPLv2 with classpath exception |
| | | | |
| | javax.el-api- | 2.2.4 | CDDL + GPLv2 with classpath exception |
| | | | link from artifact (META-INF/maven/javax.el/javax.el-api/pom.xml) |

```

<TR>
<TD>javax.inject-2.4.0-b25</TD><TD>jar</TD><TD>2.4.0-b25</TD><TD><A
HREF="https://glassfish.java.net/nonav/public/CDDL+GPL_1_1.html">link from artifact (META-
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<TR>
<TD><A HREF="http://jax-rs-spec.java.net">javax.ws.rs-api-
2.0.1</A></TD><TD>jar</TD><TD>2.0.1</TD><TD><A
HREF="http://glassfish.java.net/public/CDDL+GPL_1_1.html">GPL2 w/ CPE</A><br><A
HREF="http://glassfish.java.net/public/CDDL+GPL_1_1.html">CDDL 1.1</A><br><A
HREF="http://glassfish.java.net/public/CDDL+GPL_1_1.html,
http://glassfish.java.net/public/CDDL+GPL_1_1.html">link from artifact (META-
INF/maven/javax.ws.rs/javax.ws.rs-api/pom.xml)</A><br></TD></TR>
<TR>
<TD><A HREF="http://www.jboss.org">jboss-logging-
3.1.3.GA</A></TD><TD>jar</TD><TD>3.1.3.GA</TD><TD><A
HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br><A
HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache License, version 2.0</A><br></TD></TR>
<TR>
<TD>jersey-bean-validation-2.19</TD><TD>jar</TD><TD>2.19</TD><TD><A
HREF="http://glassfish.java.net/public/CDDL+GPL_1_1.html">link from artifact (META-
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<TR>
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<TR>
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<TR>
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HREF="http://glassfish.java.net/public/CDDL+GPL_1_1.html">link from artifact (META-
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<TR>
<TD>jersey-server-2.19</TD><TD>jar</TD><TD>2.19</TD><TD><A
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<TR>
<TD><A HREF="http://jline.sourceforge.net">jline-0.9.94</A></TD><TD>jar</TD><TD>0.9.94</TD><TD><A
HREF="LICENSE.txt">BSD</A><br></TD></TR>
<TR>
<TD><A HREF="http://pholser.github.com/jopt-simple">jopt-simple-
4.9</A></TD><TD>jar</TD><TD>4.9</TD><TD><A HREF="http://www.opensource.org/licenses/mit-
license.php">The MIT License</A><br></TD></TR>

```

| | | | |
|--|---|-----|---|
| | kafka-avro-serializer-5.0.1-beta180802235906 | jar | 5.0.1-beta180802235906 |
| | kafka-clients-2.0.1-beta180802235906 | jar | included file |
| | kafka-connect-avro-converter-5.0.1-beta180802235906 | jar | 5.0.1-beta180802235906 |
| | kafka-json-serializer-5.0.1-beta180802235906 | jar | 5.0.1-beta180802235906 |
| | kafka-schema-registry-5.0.1-beta180802235906 | jar | 5.0.1-beta180802235906 |
| | kafka-schema-registry-client-5.0.1-beta180802235906 | jar | 5.0.1-beta180802235906 |
| | kafka_2.11-2.0.1-beta180802235906 | jar | included file |
| | log4j-1.2.17 | jar | 1.2.17 |
| | | | Apache 2.0 |
| | lz4-1.3.0 | jar | 1.3.0 |
| | metrics-core-2.2.0 | jar | 2.2.0 |
| | netty-3.7.0.Final | jar | 3.7.0.Final |
| | | | Apache 2.0 |
| | osgi-resource-locator-1.0.1 | jar | 1.0.1 |
| | | | link from artifact (META-INF/MANIFEST.MF) |
| | paranamer-2.3 | jar | 2.3 |
| | scala-library-2.11.8 | jar | 2.11.8.v20160304-115712-1706a37eb8 |
| | scala-parser-combinators_2.11-1.0.4 | jar | 1.0.4 |
| | slf4j-api-1.6.4 | jar | 1.6.4 |

| |
|--|
| <TD>slf4j-api-1.7.21</TD><TD>jar</TD><TD>1.7.21</TD><TD></TD></TR> |
| <TR> |
| <TD>slf4j-log4j12-1.7.6</TD><TD>jar</TD><TD>1.7.6</TD><TD></TD></TR> |
| <TR> |
| <TD>snappy-java-1.0.5</TD><TD>jar</TD><TD>1.0.5</TD><TD>Apache 2.0
</TD></TR> |
| <TR> |
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</TD></TR> |
| <TR> |
| <TD>xz-1.0</TD><TD>jar</TD><TD></TD><TD></TD></TR> |
| <TR> |
| <TD>zkclient-0.9</TD><TD>jar</TD><TD>0.9</TD><TD></TD></TR> |
| <TR> |
| <TD>zookeeper-3.4.8</TD><TD>jar</TD><TD>3.4.8</TD><TD>Apache 2.0
</TD></TR> |

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Other developers who have contributed code are:

* Brian Langel
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Format: <http://www.debian.org/doc/packaging-manuals/copyright-format/1.0/>
Upstream-Name: schema-registry
Source: <https://github.com/confluentinc/schema-registry>

Files: *
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```
<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html><head>
<title>301 Moved Permanently</title>
</head><body>
```

```
<h1>Moved Permanently</h1>
<p>The document has moved <a href="https://opensource.org/licenses/mit-license.php">here</a>.</p>
</body></html>
```

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```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
```

```
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

```
<head>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
```

```
<title>Untitled Document</title>
```

```
</head>
```

```
<body>
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
```

```
<HTML>
```

```
<!-- @page { margin: 0.79in } P { margin-bottom: 0.08in } H1 { margin-top: 0in; margin-bottom: 0.17in; widows: 0; orphans: 0 } H1.western { font-family: "Times New Roman", serif; font-size: 12pt; font-weight: normal } H1.cjk { font-family: "Andale Sans UI"; font-size: 12pt; font-weight: normal } H1.clt { font-family: "Tahoma"; font-size: 12pt; font-weight: normal } -->
```

```
<BODY DIR="LTR">
```

```
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```

```
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To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<blockquote>One line to give the program's name and a brief idea of what it does.<br />
```

```
Copyright (C) <year> <name of author></blockquote>
```

```
<blockquote>This program is free software; you can redistribute it and/or modify it under the terms of the GNU
```

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Also add information on how to contact you by electronic and paper mail.

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Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

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Yoyodyne, Inc., hereby disclaims all copyright interest in the program `Gnomovision' (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989

Ty Coon, President of Vice

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-

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<p>

</p>

```
<p><br />
</p>
</body>
</html>
```

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<http://www.apache.org/licenses/>

A copy is also included with both the the downloadable source code package and jar that contains class bytecodes, as file "ASL 2.0". In both cases, that file should be located next to this file: in source distribution the location should be "release-notes/asl"; and in jar "META-INF/"

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1">
<meta name="description" content="Home page of The Apache Software Foundation">

<link rel="apple-touch-icon" sizes="57x57" href="/favicons/apple-touch-icon-57x57.png">
<link rel="apple-touch-icon" sizes="60x60" href="/favicons/apple-touch-icon-60x60.png">
<link rel="apple-touch-icon" sizes="72x72" href="/favicons/apple-touch-icon-72x72.png">
<link rel="apple-touch-icon" sizes="76x76" href="/favicons/apple-touch-icon-76x76.png">
<link rel="apple-touch-icon" sizes="114x114" href="/favicons/apple-touch-icon-114x114.png">
<link rel="apple-touch-icon" sizes="120x120" href="/favicons/apple-touch-icon-120x120.png">
<link rel="apple-touch-icon" sizes="144x144" href="/favicons/apple-touch-icon-144x144.png">
<link rel="apple-touch-icon" sizes="152x152" href="/favicons/apple-touch-icon-152x152.png">
<link rel="apple-touch-icon" sizes="180x180" href="/favicons/apple-touch-icon-180x180.png">
<link rel="icon" type="image/png" href="/favicons/favicon-32x32.png" sizes="32x32">
<link rel="icon" type="image/png" href="/favicons/favicon-194x194.png" sizes="194x194">
<link rel="icon" type="image/png" href="/favicons/favicon-96x96.png" sizes="96x96">
<link rel="icon" type="image/png" href="/favicons/android-chrome-192x192.png" sizes="192x192">
<link rel="icon" type="image/png" href="/favicons/favicon-16x16.png" sizes="16x16">
<link rel="manifest" href="/favicons/manifest.json">
<link rel="shortcut icon" href="/favicons/favicon.ico">
<meta name="msapplication-TileColor" content="#603cba">
<meta name="msapplication-TileImage" content="/favicons/mstile-144x144.png">
<meta name="msapplication-config" content="/favicons/browserconfig.xml">
<meta name="theme-color" content="#303284">

<title>Apache License, Version 2.0</title>
<link href='https://fonts.googleapis.com/css?family=Source+Sans+Pro:400,700%7cDroid+Serif:400,700'
```

```
rel='stylesheet' type='text/css'>
<link href="/css/min.bootstrap.css" rel="stylesheet">
<link href="/css/styles.css" rel="stylesheet">
```

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```
</head>
```

```
<body>
```

```
<!-- Navigation -->
```

```
<header>
```

```
<nav class="navbar navbar-default navbar-fixed-top">
```

```
<div class="container">
```

```
<div class="navbar-header">
```

```
<button class="navbar-toggle" type="button" data-toggle="collapse" data-target="#mainnav-collapse">
```

```
<span class="sr-only">Toggle navigation</span>
```

```
<span class="icon-bar"></span>
```

```
<span class="icon-bar"></span>
```

```
<span class="icon-bar"></span>
```

```
</button>
```

```
<a href="#" class="navbar-brand"><span class="glyphicon glyphicon-home"></span></a>
```

```
</div>
```

```
<div class="collapse navbar-collapse" id="mainnav-collapse">
```

```
<div style="line-height:20px; padding-top:5px; float:left"><a href="/">Home</a>&nbsp;&raquo;&nbsp;&raquo;&nbsp;&raquo;<a href="/licenses/">Licenses</a></div>
```

```
<ul class="nav navbar-nav navbar-right">
```

```
<li class="dropdown">
```

```
<a href="#" class="dropdown-toggle" data-toggle="dropdown">About <span class="caret"></span></a>
```

```
<ul class="dropdown-menu" role="menu">
```

```
<li><a href="/foundation">Overview</a></li>
```

```
<li><a href="/foundation/members.html">Members</a></li>
```

```
<li><a href="/foundation/how-it-works.html">Process</a></li>
```

```
<li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
```

```
<li><a href="/foundation/glossary.html">Glossary</a></li>
```

```
<li><a href="/foundation/preFAQ.html">FAQ</a></li>
```

```
<li><a href="/foundation/contact.html ">Contact</a></li>
```

```
</ul>
```

```
</li>
```

```
<li><a href="/index.html#projects-list">Projects</a></li>
```

```
<li class="dropdown">
```

```
<a href="#" class="dropdown-toggle" data-toggle="dropdown">People <span class="caret"></span></a>
```

```

    <ul class="dropdown-menu" role="menu">
    <li><a href="http://people.apache.org/">Overview</a></li>
    <li><a href="http://people.apache.org/committer-index.html">Committers</a></li>
    <li><a href="/foundation/how-it-works.html#meritocracy">Meritocracy</a></li>
    <li><a href="/foundation/how-it-works.html#roles">Roles</a></li>
    <li><a href="http://planet.apache.org/">Planet Apache</a></li>
    </ul>
    </li>
    <li class="dropdown">
    <a href="#" class="dropdown-toggle" data-toggle="dropdown">Get Involved <span
class="caret"></span></a>
    <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/getinvolved.html">Overview</a></li>
    <li><a href="http://community.apache.org/">Community Development</a></li>
    <li><a href="http://helpwanted.apache.org/">Help Wanted</a></li>
    <li><a href="http://www.apachecon.com/">ApacheCon</a></li>
    </ul>
    </li>
    <li><a href="/dyn/closer.cgi">Download</a></li>
    <li class="dropdown">
    <a href="#" class="dropdown-toggle" data-toggle="dropdown">Support Apache <span
class="caret"></span></a>
    <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
    <li><a href="/foundation/contributing.html">Donations</a></li>
    <li><a href="/foundation/buy_stuff.html">Buy Stuff</a></li>
    <li><a href="/foundation/thanks.html">Thanks</a></li>
    </ul>
    </li>
    </ul>
</div>
</div>
</nav>
</header>
<!-- / Navigation -->
<div class="container">
<div class="row">
<div class="col-md-9 col-sm-8 col-xs-12">

</div>
<div class="col-md-3 col-sm-4 col-xs-12">
<div class="input-group" style="margin-bottom: 5px;">
<script>
(function() {
var cx = '005703438322411770421:5mgshgrgx2u';
var gcse = document.createElement('script');
gcse.type = 'text/javascript';
gcse.async = true;

```



```

gcse.src = (document.location.protocol == 'https:' ? 'https:' : 'http:') +
  '//cse.google.com/cse.js?cx=' + cx;
var s = document.getElementsByTagName('script')[0];
s.parentNode.insertBefore(gcse, s);
})();
</script>
<gcse:searchbox-only></gcse:searchbox-only>
</div>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/governance/">The Apache Way</a>
<a role="button" class="btn btn-block btn-default btn-xs"
href="https://community.apache.org/contributors/">Contribute</a>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/thanks.html">ASF Sponsors</a>
</div>
</div>
</div>
<div class="container"><style type="text/css">
/* The following code is added by mdx_elementid.py
It was originally lifted from http://subversion.apache.org/style/site.css */
/*
* Hide class="elementid-permalink", except when an enclosing heading
* has the :hover property.
*/
.headerlink, .elementid-permalink {
visibility: hidden;
}
h2:hover > .headerlink, h3:hover > .headerlink, h1:hover > .headerlink, h6:hover > .headerlink, h4:hover >
.headerlink, h5:hover > .headerlink, dt:hover > .elementid-permalink { visibility: visible }</style>
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```

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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
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limitations under the License.

```
</pre></div></div>
```

```
<!-- Footer -->
```

```
<footer class="bg-primary">
<div class="container">
  <div class="row">
    <br />
    <div class="col-sm-1">

</div>
<div class="col-sm-2">
  <h5 class="white">Community</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="http://community.apache.org/">Overview</a></li>
    <li><a href="/foundation/conferences.html">Conferences</a></li>
    <li><a href="http://community.apache.org/gsoc.html">Summer of Code</a></li>
    <li><a href="http://community.apache.org/newcomers/">Getting Started</a></li>
    <li><a href="/foundation/how-it-works.html">The Apache Way</a></li>
    <li><a href="/travel/">Travel Assistance</a></li>
    <li><a href="/foundation/getinvolved.html">Get Involved</a></li>
    <li><a href="http://community.apache.org/newbiefaq.html">Community FAQ</a></li>
  </ul>
</div>

<div class="col-sm-2">
<h5 class="white">Innovation</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="http://incubator.apache.org/">Incubator</a></li>
    <li><a href="http://labs.apache.org/">Labs</a></li>
    <li><a href="/licenses/">Licensing</a></li>
    <li><a href="/foundation/license-faq.html">Licensing FAQ</a></li>
    <li><a href="/foundation/marks/">Trademark Policy</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-2">
  <h5 class="white">Tech Operations</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/dev/">Developer Information</a></li>
    <li><a href="/dev/infrastructure.html">Infrastructure</a></li>
    <li><a href="/security/">Security</a></li>
    <li><a href="http://status.apache.org">Status</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-2">
  <h5 class="white">Press</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/press/">Overview</a></li>
    <li><a href="https://blogs.apache.org/">ASF News</a></li>
    <li><a href="https://blogs.apache.org/foundation/">Announcements</a></li>
    <li><a href="https://twitter.com/TheASF">Twitter Feed</a></li>
    <li><a href="/press/#contact">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-2">
  <h5 class="white">Legal</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/legal/">Legal Affairs</a></li>
    <li><a href="/licenses/">Licenses</a></li>
    <li><a href="/foundation/marks/">Trademark Policy</a></li>
    <li><a href="/foundation/records/">Public Records</a></li>
    <li><a href="/foundation/policies/privacy.html">Privacy Policy</a></li>
    <li><a href="/licenses/exports/">Export Information</a></li>
    <li><a href="/foundation/license-faq.html">License/Distribution FAQ</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-1">
</div>
```

```
</div>
```

```
<hr class="col-lg-12 hr-white" />
```

```
<div class="row">
```

```
<div class="col-lg-12">
```

```
<p class="text-center">Copyright © 1999-2016 The Apache Software Foundation, Licensed under the <a
class="white" href="http://www.apache.org/licenses/LICENSE-2.0">Apache License, Version 2.0</a>.</p>
```

```
<p class="text-center">Apache and the Apache feather logo are trademarks of The Apache Software
Foundation.</p>
```

```
</div>
```

```
</div>
</div>

</footer>

<!-- / Footer -->

<script src="/js/jquery-2.1.1.min.js"></script>
<script src="/js/bootstrap.js"></script>
</body>
</html>
```

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"http://www.w3.org/TR/html4/loose.dtd">
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<html lang="en-US">
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<head>
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<title>GlassFish Dual License Header and License Notice GPL v2 and CDDL</title>
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<style type="text/css">
  li { display: block;}
</style>
</head>

<body leftmargin="0" topmargin="0" marginheight="0" marginwidth="0" bgcolor="#ffffff">

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</p>

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</p>

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</li>

</ul>

</body>
</html>
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<html lang="en">
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1">
<meta name="description" content="Home page of The Apache Software Foundation">

<link rel="apple-touch-icon" sizes="57x57" href="/favicons/apple-touch-icon-57x57.png">
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<link rel="icon" type="image/png" href="/favicons/favicon-96x96.png" sizes="96x96">
<link rel="icon" type="image/png" href="/favicons/android-chrome-192x192.png" sizes="192x192">
<link rel="icon" type="image/png" href="/favicons/favicon-16x16.png" sizes="16x16">
<link rel="manifest" href="/favicons/manifest.json">
<link rel="shortcut icon" href="/favicons/favicon.ico">

```

```

<meta name="msapplication-TileColor" content="#603cba">
<meta name="msapplication-TileImage" content="/favicons/mstile-144x144.png">
<meta name="msapplication-config" content="/favicons/browserconfig.xml">
<meta name="theme-color" content="#303284">

<title>Licenses</title>
<link href='https://fonts.googleapis.com/css?family=Source+Sans+Pro:400,700%7cDroid+Serif:400,700'
rel='stylesheet' type='text/css'>
<link href="/css/min.bootstrap.css" rel="stylesheet">
<link href="/css/styles.css" rel="stylesheet">

```

```

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```

```

</head>

```

```

<body>

```

```

<!-- Navigation -->

```

```

<header>

```

```

<nav class="navbar navbar-default navbar-fixed-top">

```

```

  <div class="container">

```

```

    <div class="navbar-header">

```

```

      <button class="navbar-toggle" type="button" data-toggle="collapse" data-target="#mainnav-collapse">

```

```

        <span class="sr-only">Toggle navigation</span>

```

```

        <span class="icon-bar"></span>

```

```

        <span class="icon-bar"></span>

```

```

        <span class="icon-bar"></span>

```

```

      </button>

```

```

      <a href="#" class="navbar-brand"><span class="glyphicon glyphicon-home"></span></a>

```

```

    </div>

```

```

    <div class="collapse navbar-collapse" id="mainnav-collapse">

```

```

      <div style="line-height:20px; padding-top:5px; float:left"><a href="/">Home</a>&nbsp;&raquo;&nbsp;&nbsp;&a
href="/licenses/">Licenses</a></div>

```

```

      <ul class="nav navbar-nav navbar-right">

```

```

        <li class="dropdown">

```

```

          <a href="#" class="dropdown-toggle" data-toggle="dropdown">About <span class="caret"></span></a>

```

```

          <ul class="dropdown-menu" role="menu">

```

```

            <li><a href="/foundation">Overview</a></li>

```

```

            <li><a href="/foundation/members.html">Members</a></li>

```

```

            <li><a href="/foundation/how-it-works.html">Process</a></li>

```

```

            <li><a href="/foundation/sponsorship.html">Sponsorship</a></li>

```

```

            <li><a href="/foundation/glossary.html">Glossary</a></li>

```



```

<li><a href="/foundation/preFAQ.html">FAQ</a></li>
<li><a href="/foundation/contact.html ">Contact</a></li>
</ul>
</li>
<li><a href="/index.html#projects-list">Projects</a></li>
<li class="dropdown">
  <a href="#" class="dropdown-toggle" data-toggle="dropdown">People <span class="caret"></span></a>
  <ul class="dropdown-menu" role="menu">
<li><a href="http://people.apache.org/">Overview</a></li>
<li><a href="http://people.apache.org/committer-index.html">Committers</a></li>
<li><a href="/foundation/how-it-works.html#meritocracy">Meritocracy</a></li>
<li><a href="/foundation/how-it-works.html#roles">Roles</a></li>
<li><a href="http://planet.apache.org/">Planet Apache</a></li>
  </ul>
</li>
<li class="dropdown">
  <a href="#" class="dropdown-toggle" data-toggle="dropdown">Get Involved <span
class="caret"></span></a>
  <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/getinvolved.html">Overview</a></li>
    <li><a href="http://community.apache.org/">Community Development</a></li>
    <li><a href="http://helpwanted.apache.org/">Help Wanted</a></li>
    <li><a href="http://www.apachecon.com/">ApacheCon</a></li>
  </ul>
</li>
<li><a href="/dyn/closer.cgi">Download</a></li>
<li class="dropdown">
  <a href="#" class="dropdown-toggle" data-toggle="dropdown">Support Apache <span
class="caret"></span></a>
  <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
    <li><a href="/foundation/contributing.html">Donations</a></li>
    <li><a href="/foundation/buy_stuff.html">Buy Stuff</a></li>
    <li><a href="/foundation/thanks.html">Thanks</a></li>
  </ul>
</li>
</ul>
</div>
</div>
</nav>
</header>
<!-- / Navigation -->
<div class="container">
<div class="row">
<div class="col-md-9 col-sm-8 col-xs-12">
  
</div>
<div class="col-md-3 col-sm-4 col-xs-12">

```

```

<div class="input-group" style="margin-bottom: 5px;">
<script>
(function() {
var cx = '005703438322411770421:5mgshgrgx2u';
var gcse = document.createElement('script');
gcse.type = 'text/javascript';
gcse.async = true;
gcse.src = (document.location.protocol == 'https:' ? 'https:' : 'http:') +
  '//cse.google.com/cse.js?cx=' + cx;
var s = document.getElementsByTagName('script')[0];
s.parentNode.insertBefore(gcse, s);
})();
</script>
<gcse:searchbox-only></gcse:searchbox-only>
</div>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/governance/">The Apache Way</a>
<a role="button" class="btn btn-block btn-default btn-xs"
href="https://community.apache.org/contributors/">Contribute</a>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/thanks.html">ASF Sponsors</a>
</div>
</div>
</div>
<div class="container"><style type="text/css">
/* The following code is added by mdx_elementid.py
It was originally lifted from http://subversion.apache.org/style/site.css */
/*
* Hide class="elementid-permalink", except when an enclosing heading
* has the :hover property.
*/
.headerlink, .elementid-permalink {
visibility: hidden;
}
h2:hover > .headerlink, h3:hover > .headerlink, h1:hover > .headerlink, h6:hover > .headerlink, h4:hover >
.headerlink, h5:hover > .headerlink, dt:hover > .elementid-permalink { visibility: visible }</style>
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<blockquote>

<p>gpg --armor --detach-sign icla.pdf</p>

</blockquote>

<p>The above will create a file icla.pdf.asc. Send both the file and signature as attachments in the same email to secretary@apache.org. Please send only one document (file plus signature) per email. Please do not submit your public key to Apache. Instead, please upload your public key to pgpkeys.mit.edu. </p>

<p>The files typically are named
icla.pdf and icla.pdf.asc for individual agreements;
ccla.pdf and ccla.pdf.asc for corporate agreements;

software-grant.pdf and software-grant.pdf.asc for grants. </p>
<h1 id="crypto">Export restrictions¶</h1>
<p>For export restriction information, please consult our ASF Export
Classifications page.</p>
<h1 id="trademarks">Trademark and Logo Usage<a class="headerlink" href="#trademarks" title="Permanent
link">¶</h1>
<p>For ASF trademark and logo usage information, please consult our ASF
Trademark Use Policy page.</p>
<h1 id="questions">Questions?¶</h1>
<p>For answers to frequently asked licensing questions, please consult our
Licensing Frequently Asked Questions page.</p></div>

<!-- Footer -->

```
<footer class="bg-primary">
  <div class="container">
    <div class="row">
      <br />
      <div class="col-sm-1">

        </div>
        <div class="col-sm-2">
          <h5 class="white">Community</h5>
          <ul class="list-unstyled white" role="menu">
            <li><a href="http://community.apache.org/">Overview</a></li>
            <li><a href="/foundation/conferences.html">Conferences</a></li>
            <li><a href="http://community.apache.org/gsoc.html">Summer of Code</a></li>
            <li><a href="http://community.apache.org/newcomers/">Getting Started</a></li>
            <li><a href="/foundation/how-it-works.html">The Apache Way</a></li>
            <li><a href="/travel/">Travel Assistance</a></li>
            <li><a href="/foundation/getinvolved.html">Get Involved</a></li>
            <li><a href="http://community.apache.org/newbiefaq.html">Community FAQ</a></li>
          </ul>
        </div>

        <div class="col-sm-2">
          <h5 class="white">Innovation</h5>
          <ul class="list-unstyled white" role="menu">
            <li><a href="http://incubator.apache.org/">Incubator</a></li>
            <li><a href="http://labs.apache.org/">Labs</a></li>
            <li><a href="/licenses/">Licensing</a></li>
            <li><a href="/foundation/license-faq.html">Licensing FAQ</a></li>
            <li><a href="/foundation/marks/">Trademark Policy</a></li>
            <li><a href="/foundation/contact.html">Contacts</a></li>
          </ul>
        </div>

        <div class="col-sm-2">
```

```
<h5 class="white">Tech Operations</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/dev/">Developer Information</a></li>
    <li><a href="/dev/infrastructure.html">Infrastructure</a></li>
    <li><a href="/security/">Security</a></li>
    <li><a href="http://status.apache.org">Status</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-2">
  <h5 class="white">Press</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/press/">Overview</a></li>
    <li><a href="https://blogs.apache.org/">ASF News</a></li>
    <li><a href="https://blogs.apache.org/foundation/">Announcements</a></li>
    <li><a href="https://twitter.com/TheASF">Twitter Feed</a></li>
    <li><a href="/press/#contact">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-2">
  <h5 class="white">Legal</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/legal/">Legal Affairs</a></li>
    <li><a href="/licenses/">Licenses</a></li>
    <li><a href="/foundation/marks/">Trademark Policy</a></li>
    <li><a href="/foundation/records/">Public Records</a></li>
    <li><a href="/foundation/policies/privacy.html">Privacy Policy</a></li>
    <li><a href="/licenses/exports/">Export Information</a></li>
    <li><a href="/foundation/license-faq.html">License/Distribution FAQ</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>
```

```
<div class="col-sm-1">
</div>
```

```
</div>
<hr class="col-lg-12 hr-white" />
<div class="row">
  <div class="col-lg-12">
    <p class="text-center">Copyright &#169; 2016 The Apache Software Foundation, Licensed under the <a
class="white" href="http://www.apache.org/licenses/LICENSE-2.0">Apache License, Version 2.0</a>.</p>
    <p class="text-center">Apache and the Apache feather logo are trademarks of The Apache Software
Foundation.</p>
  </div>
</div>
```

</div>

</footer>

<!-- / Footer -->

<script src="/js/jquery-2.1.1.min.js"></script>

<script src="/js/bootstrap.js"></script>

</body>

</html>

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```
cd <SRC_PATH>
mvn package -DskipTests
mkdir /tmp/jars
mkdir /tmp/overrides
cp package-schema-registry/target/kafka-schema-registry-package-<VERSION>-package/share/java/schema-registry/*.jar /tmp/jars/
cp package-kafka-serde-tools/target/kafka-serde-tools-package-<VERSION>-package/share/java/kafka-serde-tools/*.jar /tmp/jars/
cd <LICENSE_TOOL_PATH>
./bin/run_license_job.bash -i /tmp/jars -l <SRC_PATH>/licenses -n <SRC_PATH>/notices -h <SRC_PATH>/licenses-and-notices.html -o /tmp/overrides
```

6.1 consul 0.7.5

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Version 2.0, January 2004

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Go support for Protocol Buffers - Google's data interchange format

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<https://github.com/golang/protobuf>

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6.4 rabbitmq-server 3.6.12

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amqp-client-3.5.6-sources.jar\com\rabbitmq\tools\json\JSONWriter.java

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amqp-client-3.5.6-sources.jar\com\rabbitmq\client\impl\VariableLinkedBlockingQueue.java

```
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JMS Client for Pivotal RabbitMQ 1.4.6 GA

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6.5 rabbitmq_amqp1_0 3.6.12

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6.7 rabbitmq_auth_mechanism_ssl 3.6.12

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6.8 rabbitmq_consistent_hash_exchange

3.6.12

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6.9 rabbitmq_event_exchange 3.6.12

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6.11 rabbitmq_federation_management 3.6.12

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amqp-client-3.5.6-sources.jar\com\rabbitmq\tools\json\JSONWriter.java

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amqp-client-3.5.6-sources.jar\com\rabbitmq\client\impl\VariableLinkedBlockingQueue.java

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6.15 rabbitmq_management_visualiser 3.6.12

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3.6.12

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6.20 rabbitmq_shovel_management 3.6.12

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6.25 rabbitmq_web_dispatch 3.6.12

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6.28 rabbitmq_web_stomp 3.6.12

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6.30 sensu 0.12.2

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6.31 Sensu-Dashboard 0.10.2

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6.32 sockjs 0.3.4

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7.4 Lua 5.2

7.5 nginx 1.8.1

7.5.1 Available under license :

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7.6 schemaregistry 4.0.1-1

7.6.1 Available under license :

```
<HTML><HEAD><style>
table {
  border-collapse: collapse;
  width: 100%;
  font-family: sans-serif;
}
h1 {
  font-family: sans-serif;
}

th, td {
  text-align: left;
  padding: 8px;
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thead td {
  background-color: #333;
  color: #fff;
  font-weight: bold;
}
```



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tr:nth-child(even){background-color: #f2f2f2}
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th {
```

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```

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  color: white;
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}
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```
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<TD>Artifact</TD><TD>Type</TD><TD>Version</TD><TD>License(s)</TD></TR>
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```
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```

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```
  HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br></TD></TR>
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```
1.0.0</A></TD><TD>jar</TD><TD>1.0.0</TD><TD><A HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br></TD></TR>
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<TR>
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1.4.1</A></TD><TD>jar</TD><TD>1.4.1</TD><TD><A HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br></TD></TR>
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  HREF="http://www.apache.org/licenses/LICENSE-2.0.txt">Apache 2.0</A><br></TD></TR>
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```
  HREF="https://glassfish.java.net/nonav/public/CDDL+GPL_1_1.html">link from artifact (META-INF/MANIFEST.MF)</A><br></TD></TR>
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<TR>
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```
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b25</A></TD><TD>jar</TD><TD>2.4.0-b25</TD><TD><A
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```
  HREF="https://glassfish.java.net/nonav/public/CDDL+GPL_1_1.html">link from artifact (META-INF/MANIFEST.MF)</A><br></TD></TR>
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<TD><A HREF="http://github.com/FasterXML/jackson">jackson-annotations-
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|---------------------------|-----|-----------|--|
| 2.5.0 | jar | 2.5.0 | Apache 2.0 |
| 2.5.4 | jar | 2.5.4 | Apache 2.0 |
| jackson-core-asl-1.9.13 | jar | 1.9.13 | Apache 2.0 |
| jackson-databind-2.5.4 | jar | 2.5.4 | Apache 2.0 |
| jackson-mapper-asl-1.9.13 | jar | 1.9.13 | Apache 2.0 |
| javassist-3.18.1-GA | jar | 3.18.1-GA | Apache 2.0 , MPL 1.1 , http://www.gnu.org/licenses/lgpl-2.1.html , link from artifact (META-INF/maven/org.javassist/javassist/pom.xml) |
| javax.annotation-api-1.2 | jar | 1.2 | link from artifact (META-INF/maven/javax.annotation/javax.annotation-api/pom.xml) , CDDL + GPLv2 with classpath exception |
| javax.el-2.2.4 | jar | 2.2.4 | link from artifact (META-INF/maven/org.glassfish.web/javax.el/pom.xml) , CDDL + GPLv2 with classpath exception |
| javax.el-api-2.2.4 | jar | 2.2.4 | CDDL + GPLv2 with classpath exception , link from artifact (META-INF/maven/javax.el/javax.el-api/pom.xml) |
| javax.inject-2.4.0-b25 | jar | 2.4.0-b25 | link from artifact (META-INF/MANIFEST.MF) |

```

<TD><A HREF="http://jax-rs-spec.java.net">javax.ws.rs-api-
2.0.1</A></TD><TD>jar</TD><TD>2.0.1</TD><TD><A
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Other developers who have contributed code are:

* Brian Langel

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```
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

```
<head>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
```

```
<title>Untitled Document</title>
```

```
</head>
```

```
<body>
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
```

```
<HTML>
```

```
<!-- @page { margin: 0.79in } P { margin-bottom: 0.08in } H1 { margin-top: 0in; margin-bottom: 0.17in; widows: 0; orphans: 0 } H1.western { font-family: "Times New Roman", serif; font-size: 12pt; font-weight: normal } H1.cjk { font-family: "Andale Sans UI"; font-size: 12pt; font-weight: normal } H1.cnl { font-family: "Tahoma"; font-size: 12pt; font-weight: normal } -->
```

```
<BODY DIR="LTR">
```

```
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```

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```
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```

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```
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passes at compilers) written by James Hacker.
```

```
signature of Ty Coon, 1 April 1989
```

```
Ty Coon, President of Vice
```

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<li style="background-color: yellow;">

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<p>

</p>

<p>

</p>

</body>

</html>

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A copy is also included with both the the downloadable source code package and jar that contains class bytecodes, as file "ASL 2.0". In both cases, that file should be located next to this file: in source distribution the location should be "release-notes/asl"; and in jar "META-INF/"

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
<head>
```

```
<meta charset="utf-8">
```

```
<meta http-equiv="X-UA-Compatible" content="IE=edge">
```

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

```
<meta name="description" content="Home page of The Apache Software Foundation">
```

```
<link rel="apple-touch-icon" sizes="57x57" href="/favicons/apple-touch-icon-57x57.png">
```

```
<link rel="apple-touch-icon" sizes="60x60" href="/favicons/apple-touch-icon-60x60.png">
```

```
<link rel="apple-touch-icon" sizes="72x72" href="/favicons/apple-touch-icon-72x72.png">
```

```
<link rel="apple-touch-icon" sizes="76x76" href="/favicons/apple-touch-icon-76x76.png">
```

```
<link rel="apple-touch-icon" sizes="114x114" href="/favicons/apple-touch-icon-114x114.png">
```

```
<link rel="apple-touch-icon" sizes="120x120" href="/favicons/apple-touch-icon-120x120.png">
```

```
<link rel="apple-touch-icon" sizes="144x144" href="/favicons/apple-touch-icon-144x144.png">
```

```
<link rel="apple-touch-icon" sizes="152x152" href="/favicons/apple-touch-icon-152x152.png">
```

```
<link rel="apple-touch-icon" sizes="180x180" href="/favicons/apple-touch-icon-180x180.png">
```

```
<link rel="icon" type="image/png" href="/favicons/favicon-32x32.png" sizes="32x32">
```

```
<link rel="icon" type="image/png" href="/favicons/favicon-194x194.png" sizes="194x194">
```

```
<link rel="icon" type="image/png" href="/favicons/favicon-96x96.png" sizes="96x96">
```

```
<link rel="icon" type="image/png" href="/favicons/android-chrome-192x192.png" sizes="192x192">
```

```
<link rel="icon" type="image/png" href="/favicons/favicon-16x16.png" sizes="16x16">
```

```
<link rel="manifest" href="/favicons/manifest.json">
```

```
<link rel="shortcut icon" href="/favicons/favicon.ico">
```

```
<meta name="msapplication-TileColor" content="#603cba">
```

```
<meta name="msapplication-TileImage" content="/favicons/mstile-144x144.png">
```

```
<meta name="msapplication-config" content="/favicons/browserconfig.xml">
```

```
<meta name="theme-color" content="#303284">
```

```
<title>Apache License, Version 2.0</title>
```

```
<link href='https://fonts.googleapis.com/css?family=Source+Sans+Pro:400,700%7cDroid+Serif:400,700' rel='stylesheet' type='text/css'>
```

```
<link href="/css/min.bootstrap.css" rel="stylesheet">
```

```
<link href="/css/styles.css" rel="stylesheet">
```

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</head>

<body>

<!-- Navigation -->

<header>

<nav class="navbar navbar-default navbar-fixed-top">

<div class="container">

<div class="navbar-header">

<button class="navbar-toggle" type="button" data-toggle="collapse" data-target="#mainnav-collapse">

Toggle navigation

</button>

</div>

<div class="collapse navbar-collapse" id="mainnav-collapse">

<div style="line-height:20px; padding-top:5px; float:left">Home » Licenses</div>

<ul class="nav navbar-nav navbar-right">

<li class="dropdown">

About

<ul class="dropdown-menu" role="menu">

Overview

Members

Process

Sponsorship

Glossary

FAQ

Contact

Projects

<li class="dropdown">

People

<ul class="dropdown-menu" role="menu">

Overview

Committers

```

<li><a href="/foundation/how-it-works.html#meritocracy">Meritocracy</a></li>
<li><a href="/foundation/how-it-works.html#roles">Roles</a></li>
<li><a href="http://planet.apache.org/">Planet Apache</a></li>
</ul>
</li>
<li class="dropdown">
  <a href="#" class="dropdown-toggle" data-toggle="dropdown">Get Involved <span
class="caret"></span></a>
  <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/getinvolved.html">Overview</a></li>
    <li><a href="http://community.apache.org/">Community Development</a></li>
    <li><a href="http://helpwanted.apache.org/">Help Wanted</a></li>
    <li><a href="http://www.apachecon.com/">ApacheCon</a></li>
  </ul>
</li>
<li><a href="/dyn/closer.cgi">Download</a></li>
<li class="dropdown">
  <a href="#" class="dropdown-toggle" data-toggle="dropdown">Support Apache <span
class="caret"></span></a>
  <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
    <li><a href="/foundation/contributing.html">Donations</a></li>
    <li><a href="/foundation/buy_stuff.html">Buy Stuff</a></li>
    <li><a href="/foundation/thanks.html">Thanks</a></li>
  </ul>
</li>
</ul>
</div>
</nav>
</header>
<!-- / Navigation -->
<div class="container">
<div class="row">
<div class="col-md-9 col-sm-8 col-xs-12">
  
</div>
<div class="col-md-3 col-sm-4 col-xs-12">
  <div class="input-group" style="margin-bottom: 5px;">
    <script>
(function() {
var cx = '005703438322411770421:5mgshgrgx2u';
var gcse = document.createElement('script');
gcse.type = 'text/javascript';
gcse.async = true;
gcse.src = (document.location.protocol == 'https:' ? 'https:' : 'http:') +
  '//cse.google.com/cse.js?cx=' + cx;
var s = document.getElementsByTagName('script')[0];

```

```

    s.parentNode.insertBefore(gcse, s);
  })();
</script>
  <gcse:searchbox-only></gcse:searchbox-only>
</div>
  <a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/governance/">The Apache Way</a>
  <a role="button" class="btn btn-block btn-default btn-xs"
href="https://community.apache.org/contributors/">Contribute</a>
  <a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/thanks.html">ASF Sponsors</a>
</div>
</div>
</div>
<div class="container"><style type="text/css">
/* The following code is added by mdx_elementid.py
It was originally lifted from http://subversion.apache.org/style/site.css */
/*
* Hide class="elementid-permalink", except when an enclosing heading
* has the :hover property.
*/
.headerlink, .elementid-permalink {
  visibility: hidden;
}
h2:hover > .headerlink, h3:hover > .headerlink, h1:hover > .headerlink, h6:hover > .headerlink, h4:hover >
.headerlink, h5:hover > .headerlink, dt:hover > .elementid-permalink { visibility: visible }</style>
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```

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```
</pre></div></div>
```

```
<!-- Footer -->
```

```
<footer class="bg-primary">
```

```
<div class="container">
```

```
<div class="row">
```

```
<br />
```

```
<div class="col-sm-1">
```

```
</div>
```

```
<div class="col-sm-2">
```

```
<h5 class="white">Community</h5>
```

```
<ul class="list-unstyled white" role="menu">
```

```
<li><a href="http://community.apache.org/">Overview</a></li>
```

```
<li><a href="/foundation/conferences.html">Conferences</a></li>
```

```
<li><a href="http://community.apache.org/gsoc.html">Summer of Code</a></li>
```

```
<li><a href="http://community.apache.org/newcomers/">Getting Started</a></li>
```

```
<li><a href="/foundation/how-it-works.html">The Apache Way</a></li>
```

```
<li><a href="/travel/">Travel Assistance</a></li>
```

```
<li><a href="/foundation/getinvolved.html">Get Involved</a></li>
```

```
<li><a href="http://community.apache.org/newbiefaq.html">Community FAQ</a></li>
```

```
</ul>
```

```
</div>
```

```
<div class="col-sm-2">
```

```
<h5 class="white">Innovation</h5>
```

```
<ul class="list-unstyled white" role="menu">
```

```
<li><a href="http://incubator.apache.org/">Incubator</a></li>
```

```
<li><a href="http://labs.apache.org/">Labs</a></li>
```

```
<li><a href="/licenses/">Licensing</a></li>
```

```
<li><a href="/foundation/license-faq.html">Licensing FAQ</a></li>
```

```
<li><a href="/foundation/marks/">Trademark Policy</a></li>
```

```
<li><a href="/foundation/contact.html">Contacts</a></li>
```

```
</ul>
```

```
</div>
```

```
<div class="col-sm-2">
```

```
<h5 class="white">Tech Operations</h5>
```

```
<ul class="list-unstyled white" role="menu">
```

```
<li><a href="/dev/">Developer Information</a></li>
<li><a href="/dev/infrastructure.html">Infrastructure</a></li>
<li><a href="/security/">Security</a></li>
<li><a href="http://status.apache.org">Status</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>
```

```
<div class="col-sm-2">
<h5 class="white">Press</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/press/">Overview</a></li>
<li><a href="https://blogs.apache.org/">ASF News</a></li>
<li><a href="https://blogs.apache.org/foundation/">Announcements</a></li>
<li><a href="https://twitter.com/TheASF">Twitter Feed</a></li>
<li><a href="/press/#contact">Contacts</a></li>
</ul>
</div>
```

```
<div class="col-sm-2">
<h5 class="white">Legal</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/legal/">Legal Affairs</a></li>
<li><a href="/licenses/">Licenses</a></li>
<li><a href="/foundation/marks/">Trademark Policy</a></li>
<li><a href="/foundation/records/">Public Records</a></li>
<li><a href="/foundation/policies/privacy.html">Privacy Policy</a></li>
<li><a href="/licenses/exports/">Export Information</a></li>
<li><a href="/foundation/license-faq.html">License/Distribution FAQ</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>
```

```
<div class="col-sm-1">
</div>
```

```
</div>
<hr class="col-lg-12 hr-white" />
<div class="row">
<div class="col-lg-12">
<p class="text-center">Copyright © 2016 The Apache Software Foundation, Licensed under the <a
class="white" href="http://www.apache.org/licenses/LICENSE-2.0">Apache License, Version 2.0</a>.</p>
<p class="text-center">Apache and the Apache feather logo are trademarks of The Apache Software
Foundation.</p>
</div>
</div>
</div>
```

</footer>

<!-- / Footer -->

<script src="/js/jquery-2.1.1.min.js"></script>

<script src="/js/bootstrap.js"></script>

</body>

</html>

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<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
```

```
<html lang="en-US">
```

```
<head>
```

```
<title>GlassFish Dual License Header and License Notice GPL v2 and CDDL</title>
```

```
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
```

```
<style type="text/css">
```

```
li { display: block;}
```

</style>

</head>

<body leftmargin="0" topmargin="0" marginheight="0" marginwidth="0" bgcolor="#ffffff">

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<p>

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<p>

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</p>

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</p>

<p>

The precise terms and conditions for copying, distribution and modification follow.

</p>

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</p>

<p>

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</p>

<p>

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</p>

<p>

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</p>

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</p>

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<p>

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</p>

<p>

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</p>

<p>

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</p>

<p>

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</p>


```

<ul>
<li>
<p>
One line to give the program's name and a brief idea of what it does.
</p>
</li>
<li>
<p>
Copyright (C) <year> <name of author>
</p>
</li>
<li>
<p>
This program is free software; you can redistribute it and/or modify it
under the terms of the GNU General Public License as published by the
Free Software Foundation; either version 2 of the License, or (at your
option) any later version.
</p>
</li>
<li>
<p>
This program is distributed in the hope that it will be useful, but
WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY
or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License
for more details.
</p>
</li>
<li>
<p>
You should have received a copy of the GNU General Public License along
with this program; if not, write to the Free Software Foundation, Inc.,
59 Temple Place, Suite 330, Boston, MA 02111-1307 USA
</p>
</li>
</ul>
<p>
Also add information on how to contact you by electronic and paper mail.
</p>
<p>
If the program is interactive, make it output a short notice like this
when it starts in an interactive mode:
</p>
<ul>
<li>
<p>
Gnomovision version 69, Copyright (C) year name of author<br />
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type
`show w'. This is free software, and you are welcome to redistribute

```

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</p>

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</p>

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</p>

<p>

signature of Ty Coon, 1 April 1989

Ty Coon, President of Vice

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</p>

<li style="background-color:yellow;">

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</p>

</body>

</html>

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta http-equiv="X-UA-Compatible" content="IE=edge">

<meta name="viewport" content="width=device-width, initial-scale=1">

<meta name="description" content="Home page of The Apache Software Foundation">

<link rel="apple-touch-icon" sizes="57x57" href="/favicons/apple-touch-icon-57x57.png">

<link rel="apple-touch-icon" sizes="60x60" href="/favicons/apple-touch-icon-60x60.png">

<link rel="apple-touch-icon" sizes="72x72" href="/favicons/apple-touch-icon-72x72.png">

<link rel="apple-touch-icon" sizes="76x76" href="/favicons/apple-touch-icon-76x76.png">

<link rel="apple-touch-icon" sizes="114x114" href="/favicons/apple-touch-icon-114x114.png">

<link rel="apple-touch-icon" sizes="120x120" href="/favicons/apple-touch-icon-120x120.png">

<link rel="apple-touch-icon" sizes="144x144" href="/favicons/apple-touch-icon-144x144.png">

<link rel="apple-touch-icon" sizes="152x152" href="/favicons/apple-touch-icon-152x152.png">

<link rel="apple-touch-icon" sizes="180x180" href="/favicons/apple-touch-icon-180x180.png">

<link rel="icon" type="image/png" href="/favicons/favicon-32x32.png" sizes="32x32">

<link rel="icon" type="image/png" href="/favicons/favicon-194x194.png" sizes="194x194">

<link rel="icon" type="image/png" href="/favicons/favicon-96x96.png" sizes="96x96">

<link rel="icon" type="image/png" href="/favicons/android-chrome-192x192.png" sizes="192x192">

<link rel="icon" type="image/png" href="/favicons/favicon-16x16.png" sizes="16x16">

<link rel="manifest" href="/favicons/manifest.json">

<link rel="shortcut icon" href="/favicons/favicon.ico">

<meta name="msapplication-TileColor" content="#603cba">

<meta name="msapplication-TileImage" content="/favicons/mstile-144x144.png">

<meta name="msapplication-config" content="/favicons/browserconfig.xml">

```
<meta name="theme-color" content="#303284">
```

```
<title>Licenses</title>
```

```
<link href='https://fonts.googleapis.com/css?family=Source+Sans+Pro:400,700%7cDroid+Serif:400,700'  
rel='stylesheet' type='text/css'>
```

```
<link href="/css/min.bootstrap.css" rel="stylesheet">
```

```
<link href="/css/styles.css" rel="stylesheet">
```

```
<!-- Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See  
the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF  
licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in  
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on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
See the License for the specific language governing permissions and limitations under the License. -->
```

```
</head>
```

```
<body>
```

```
<!-- Navigation -->
```

```
<header>
```

```
<nav class="navbar navbar-default navbar-fixed-top">
```

```
<div class="container">
```

```
<div class="navbar-header">
```

```
<button class="navbar-toggle" type="button" data-toggle="collapse" data-target="#mainnav-collapse">
```

```
<span class="sr-only">Toggle navigation</span>
```

```
<span class="icon-bar"></span>
```

```
<span class="icon-bar"></span>
```

```
<span class="icon-bar"></span>
```

```
</button>
```

```
<a href="#" class="navbar-brand"><span class="glyphicon glyphicon-home"></span></a>
```

```
</div>
```

```
<div class="collapse navbar-collapse" id="mainnav-collapse">
```

```
<div style="line-height:20px; padding-top:5px; float:left"><a href="/">Home</a>&nbsp;&raquo;&nbsp;&lt;a  
href="/licenses/">Licenses</a></div>
```

```
<ul class="nav navbar-nav navbar-right">
```

```
<li class="dropdown">
```

```
<a href="#" class="dropdown-toggle" data-toggle="dropdown">About <span class="caret"></span></a>
```

```
<ul class="dropdown-menu" role="menu">
```

```
<li><a href="/foundation">Overview</a></li>
```

```
<li><a href="/foundation/members.html">Members</a></li>
```

```
<li><a href="/foundation/how-it-works.html">Process</a></li>
```

```
<li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
```

```
<li><a href="/foundation/glossary.html">Glossary</a></li>
```

```
<li><a href="/foundation/preFAQ.html">FAQ</a></li>
```

```
<li><a href="/foundation/contact.html ">Contact</a></li>
```

```
</ul>
```

```

    </li>
<li><a href="/index.html#projects-list">Projects</a></li>
<li class="dropdown">
    <a href="#" class="dropdown-toggle" data-toggle="dropdown">People <span class="caret"></span></a>
    <ul class="dropdown-menu" role="menu">
<li><a href="http://people.apache.org/">Overview</a></li>
<li><a href="http://people.apache.org/committer-index.html">Committers</a></li>
<li><a href="/foundation/how-it-works.html#meritocracy">Meritocracy</a></li>
<li><a href="/foundation/how-it-works.html#roles">Roles</a></li>
<li><a href="http://planet.apache.org/">Planet Apache</a></li>
    </ul>
</li>
<li class="dropdown">
    <a href="#" class="dropdown-toggle" data-toggle="dropdown">Get Involved <span
class="caret"></span></a>
    <ul class="dropdown-menu" role="menu">
    <li><a href="/foundation/getinvolved.html">Overview</a></li>
<li><a href="http://community.apache.org/">Community Development</a></li>
    <li><a href="http://helpwanted.apache.org/">Help Wanted</a></li>
<li><a href="http://www.apachecon.com/">ApacheCon</a></li>
    </ul>
</li>
<li><a href="/dyn/closer.cgi">Download</a></li>
<li class="dropdown">
    <a href="#" class="dropdown-toggle" data-toggle="dropdown">Support Apache <span
class="caret"></span></a>
    <ul class="dropdown-menu" role="menu">
<li><a href="/foundation/sponsorship.html">Sponsorship</a></li>
<li><a href="/foundation/contributing.html">Donations</a></li>
<li><a href="/foundation/buy_stuff.html">Buy Stuff</a></li>
<li><a href="/foundation/thanks.html">Thanks</a></li>
    </ul>
</li>
</ul>
</div>
</div>
</nav>
</header>
<!-- / Navigation -->
<div class="container">
<div class="row">
<div class="col-md-9 col-sm-8 col-xs-12">
    
</div>
<div class="col-md-3 col-sm-4 col-xs-12">
    <div class="input-group" style="margin-bottom: 5px;">
    <script>
(function() {

```

```

var cx = '005703438322411770421:5mgshgrgx2u';
var gcse = document.createElement('script');
gcse.type = 'text/javascript';
gcse.async = true;
gcse.src = (document.location.protocol == 'https:' ? 'https:' : 'http:') +
  '//cse.google.com/cse.js?cx=' + cx;
var s = document.getElementsByTagName('script')[0];
s.parentNode.insertBefore(gcse, s);
})();
</script>
<gcse:searchbox-only></gcse:searchbox-only>
</div>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/governance/">The Apache Way</a>
<a role="button" class="btn btn-block btn-default btn-xs"
href="https://community.apache.org/contributors/">Contribute</a>
<a role="button" class="btn btn-block btn-default btn-xs" href="/foundation/thanks.html">ASF Sponsors</a>
</div>
</div>
</div>
<div class="container"><style type="text/css">
/* The following code is added by mdx_elementid.py
It was originally lifted from http://subversion.apache.org/style/site.css */
/*
* Hide class="elementid-permalink", except when an enclosing heading
* has the :hover property.
*/
.headerlink, .elementid-permalink {
visibility: hidden;
}
h2:hover > .headerlink, h3:hover > .headerlink, h1:hover > .headerlink, h6:hover > .headerlink, h4:hover >
.headerlink, h5:hover > .headerlink, dt:hover > .elementid-permalink { visibility: visible }</style>
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link">&para;</a></h3>

```

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Please send only one document per email.</p>

<p>If you prefer to sign electronically, please fill the form, save it locally (e.g. icla.pdf), and sign the file by preparing a detached PGP signature. For example,</p>

<blockquote>

<p>gpg --armor --detach-sign icla.pdf</p>

</blockquote>

<p>The above will create a file icla.pdf.asc. Send both the file and signature as attachments in the same email to secretary@apache.org. Please send only one document (file plus signature) per email. Please do not submit your public key to Apache. Instead, please upload your public key to pgpkeys.mit.edu. </p>

<p>The files typically are named
icla.pdf and icla.pdf.asc for individual agreements;
ccla.pdf and ccla.pdf.asc for corporate agreements;
software-grant.pdf and software-grant.pdf.asc for grants. </p>

<h1 id="crypto">Export restrictions¶</h1>

<p>For export restriction information, please consult our ASF Export


```
Classifications</a> page.</p>
<h1 id="trademarks">Trademark and Logo Usage<a class="headerlink" href="#trademarks" title="Permanent
link">&para;</a></h1>
<p>For ASF trademark and logo usage information, please consult our <a href="/foundation/marks/">ASF
Trademark Use Policy</a> page.</p>
<h1 id="questions">Questions?<a class="headerlink" href="#questions" title="Permanent link">&para;</a></h1>
<p>For answers to frequently asked licensing questions, please consult our
<a href="/foundation/license-faq.html">Licensing Frequently Asked Questions</a> page.</p></div>
```

```
<!-- Footer -->
```

```
<footer class="bg-primary">
<div class="container">
<div class="row">
<br />
<div class="col-sm-1">

</div>
<div class="col-sm-2">
<h5 class="white">Community</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="http://community.apache.org/">Overview</a></li>
<li><a href="/foundation/conferences.html">Conferences</a></li>
<li><a href="http://community.apache.org/gsoc.html">Summer of Code</a></li>
<li><a href="http://community.apache.org/newcomers/">Getting Started</a></li>
<li><a href="/foundation/how-it-works.html">The Apache Way</a></li>
<li><a href="/travel/">Travel Assistance</a></li>
<li><a href="/foundation/getinvolved.html">Get Involved</a></li>
<li><a href="http://community.apache.org/newbiefaq.html">Community FAQ</a></li>
</ul>
</div>

<div class="col-sm-2">
<h5 class="white">Innovation</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="http://incubator.apache.org/">Incubator</a></li>
<li><a href="http://labs.apache.org/">Labs</a></li>
<li><a href="/licenses/">Licensing</a></li>
<li><a href="/foundation/license-faq.html">Licensing FAQ</a></li>
<li><a href="/foundation/marks/">Trademark Policy</a></li>
<li><a href="/foundation/contact.html">Contacts</a></li>
</ul>
</div>

<div class="col-sm-2">
<h5 class="white">Tech Operations</h5>
<ul class="list-unstyled white" role="menu">
<li><a href="/dev/">Developer Information</a></li>
```

```

    <li><a href="/dev/infrastructure.html">Infrastructure</a></li>
    <li><a href="/security/">Security</a></li>
    <li><a href="http://status.apache.org">Status</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>

<div class="col-sm-2">
<h5 class="white">Press</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/press/">Overview</a></li>
    <li><a href="https://blogs.apache.org/">ASF News</a></li>
    <li><a href="https://blogs.apache.org/foundation/">Announcements</a></li>
    <li><a href="https://twitter.com/TheASF">Twitter Feed</a></li>
    <li><a href="/press/#contact">Contacts</a></li>
  </ul>
</div>

<div class="col-sm-2">
<h5 class="white">Legal</h5>
  <ul class="list-unstyled white" role="menu">
    <li><a href="/legal/">Legal Affairs</a></li>
    <li><a href="/licenses/">Licenses</a></li>
    <li><a href="/foundation/marks/">Trademark Policy</a></li>
    <li><a href="/foundation/records/">Public Records</a></li>
    <li><a href="/foundation/policies/privacy.html">Privacy Policy</a></li>
    <li><a href="/licenses/exports/">Export Information</a></li>
    <li><a href="/foundation/license-faq.html">License/Distribution FAQ</a></li>
    <li><a href="/foundation/contact.html">Contacts</a></li>
  </ul>
</div>

<div class="col-sm-1">
</div>

</div>
<hr class="col-lg-12 hr-white" />
<div class="row">
  <div class="col-lg-12">
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    <p class="text-center">Apache and the Apache feather logo are trademarks of The Apache Software
Foundation.</p>
  </div>
</div>
</div>
</div>
</footer>

```

<!-- / Footer -->

<script src="/js/jquery-2.1.1.min.js"></script>

<script src="/js/bootstrap.js"></script>

</body>

</html>

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```
cd <SRC_PATH>
mvn package -DskipTests
mkdir /tmp/jars
mkdir /tmp/overrides
cp package-schema-registry/target/kafka-schema-registry-package-<VERSION>-package/share/java/schema-registry/*.jar /tmp/jars/
cp package-kafka-serde-tools/target/kafka-serde-tools-package-<VERSION>-package/share/java/kafka-serde-tools/*.jar /tmp/jars/
cd <LICENSE_TOOL_PATH>
./bin/run_license_job.bash -i /tmp/jars -l <SRC_PATH>/licenses -n <SRC_PATH>/notices -h <SRC_PATH>/licenses-and-notices.html -o /tmp/overrides
```

7.7 Seyren 1.4.0

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7.8 telegraf 1.6.0

8.1 Cassandra 2.2.11

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N O' P(Q) R* S+ T, U- V. W/ X
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^_ `aREAD&Lorg/apache/cassandra/auth/Permission;
DeprecatedRuntimeVisibleAnnotationsLjava/lang/Deprecated;WRITECREATEALTERDROPSELECTMODIFY
AUTHORIZEDDESCRIBEEXECUTEALLLjava/util/Set;
Signature7Ljava/util/Set<Lorg/apache/cassandra/auth/Permission;>;NONE\$VALUES'[Lorg/apache/cassandra/auth/
Permission;values)()[Lorg/apache/cassandra/auth/Permission;CodeLineNumberTablevalueOf:(Ljava/lang/String;)L
org/apache/cassandra/auth/Permission;LocalVariableTableNameLjava/lang/String;<init>(Ljava/lang/String;I)Vthis()
V<clinit>8Ljava/lang/Enum<Lorg/apache/cassandra/auth/Permission;>;
SourceFilePermission.java566bc\$org/apache/cassandra/auth/Permission;d@A@A"##(#)#*##+##,##-
#.#/#efghij01klm41java/lang/Enumclone()Ljava/lang/Object;5(Ljava/lang/Class;Ljava/lang/String;)Ljava/lang/Enu
m;java/util/EnumSetrange5(Ljava/lang/Enum;Ljava/lang/Enum;)Ljava/util/EnumSet;com/google/common/collect/S
etsimmutableEnumSet>(Ljava/lang/Iterable;)Lcom/google/common/collect/ImmutableSet;&com/google/common/c
ollect/ImmutableSetof*(Lcom/google/common/collect/ImmutableSet;@!
@"#\$%&@#\$%&@(#@)#@*#@+##@,##-#@.#@/#0123412356 789"
: ;<95*: =>?@A91*+: =B#2CDC9,Y Y
Y
YYYYYYY
Y SYSY
SYSYSYSYSYSYSY S
:6
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Compression support provided by snappy-java (<http://code.google.com/p/snappy-java/>)
Written by Taro L. Saito.

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CQL Native transport uses Netty
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LZ4 compression support provided by lz4-java (<http://github.com/jpountz/lz4-java>)
Written by Adrien Grand.
Contains bindings to the C LZ4 implementation (<http://code.google.com/p/lz4/>)
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Alternative Disruptor backed thrift server from https://github.com/xedin/disruptor_thrift_server
Written by Pavel Yaskevich.

LMAX Disruptor
(<http://lmax-exchange.github.io/disruptor/>)
Copyright 2011 LMAX Ltd.

Airline
(<https://github.com/airlift/airline>)
Copyright 2011, Dain Sundstrom dain@iq80.com
Copyright 2010, Cedric Beust cedric@beust.com

HLL++ support provided by stream-lib
(<https://github.com/addthis/stream-lib>)

Eclipse JDT
Java compilation software for user-defined-functions is provided by Eclipse,
which is open source software. The original software and
related information is available at <http://www.eclipse.org/>
(<http://www.eclipse.org/jdt/>)

SIGAR

<http://sigar.hyperic.com/>

OHC

(<https://github.com/snazy/ohc>)

Java Off-Heap-Cache, licensed under APLv2

Copyright 2014-2015 Robert Stupp, Germany.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
```

```
"http://www.w3.org/TR/html4/loose.dtd">
```

```
<!-- NewPage -->
```

```
<html lang="en">
```

```
<head>
```

```
<!-- Generated by javadoc (version 1.7.0_80) on Thu Sep 28 13:19:23 CDT 2017 -->
```

```
<title>Uses of Class org.apache.cassandra.auth.Permission (apache-cassandra API)</title>
```

```
<meta name="date" content="2017-09-28">
```

```
<link rel="stylesheet" type="text/css" href="../../../../stylesheet.css" title="Style">
```

```
</head>
```

```
<body>
```

```
<script type="text/javascript"><!--
```

```
    if (location.href.indexOf('is-external=true') == -1) {
```

```
        parent.document.title="Uses of Class org.apache.cassandra.auth.Permission (apache-cassandra API)";
```

```
    }
```

```
//-->
```

```
</script>
```

```
<noscript>
```

```
<div>JavaScript is disabled on your browser.</div>
```

```
</noscript>
```

```
<!-- ===== START OF TOP NAVBAR ===== -->
```

```
<div class="topNav"><a name="navbar_top">
```

```
<!-- -->
```

```
</a><a href="#skip-navbar_top" title="Skip navigation links"></a><a name="navbar_top_firstrow">
```

```
<!-- -->
```

```
</a>
```

```
<ul class="navList" title="Navigation">
```

```
<li><a href="../../overview-summary.html">Overview</a></li>
```

```
<li><a href="../package-summary.html">Package</a></li>
```

```
<li><a href="../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Class</a></li>
```

```
<li class="navBarCell1Rev">Use</li>
```

```
<li><a href="../../overview-tree.html">Tree</a></li>
```

```
<li><a href="../../deprecated-list.html">Deprecated</a></li>
```

```
<li><a href="../../index-all.html">Index</a></li>
```

```
<li><a href="../../help-doc.html">Help</a></li>
```

```
</ul>
```

```
</div>
```

```
<div class="subNav">
```

```
<ul class="navList">
```

```

<li>Prev</li>
<li>Next</li>
</ul>
<ul class="navList">
<li><a href=" ../../../../index.html?org/apache/cassandra/auth/class-use/Permission.html"
target="_top">Frames</a></li>
<li><a href="Permission.html" target="_top">No Frames</a></li>
</ul>
<ul class="navList" id="allclasses_navbar_top">
<li><a href=" ../../../../allclasses-noframe.html">All Classes</a></li>
</ul>
<div>
<script type="text/javascript"><!--
allClassesLink = document.getElementById("allclasses_navbar_top");
if(window==top) {
    allClassesLink.style.display = "block";
}
else {
    allClassesLink.style.display = "none";
}
//-->
</script>
</div>
<a name="skip-navbar_top">
<!-- -->
</a></div>
<!-- ===== END OF TOP NAVBAR ===== -->
<div class="header">
<h2 title="Uses of Class org.apache.cassandra.auth.Permission" class="title">Uses of
Class<br>org.apache.cassandra.auth.Permission</h2>
</div>
<div class="classUseContainer">
<ul class="blockList">
<li class="blockList">
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing packages, and an explanation">
<caption><span>Packages that use <a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Package</th>
<th class="colLast" scope="col">Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><a href="#org.apache.cassandra.auth">org.apache.cassandra.auth</a></td>
<td class="colLast">&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><a

```

```

href="#org.apache.cassandra.cql3.statements">org.apache.cassandra.cql3.statements</a></td>
<td class="colLast">&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><a href="#org.apache.cassandra.service">org.apache.cassandra.service</a></td>
<td class="colLast">&nbsp;</td>
</tr>
</tbody>
</table>
</li>
<li class="blockList">
<ul class="blockList">
<li class="blockList"><a name="org.apache.cassandra.auth">
<!-- -->
</a>
<h3>Uses of <a href=".../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> in <a href=".../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a></h3>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing fields, and an explanation">
<caption><span>Fields in <a href=".../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a> declared as <a
href=".../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Field and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code><a href=".../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></code></td>
<td class="colLast"><span class="strong">PermissionDetails.</span><code><strong><a
href=".../org/apache/cassandra/auth/PermissionDetails.html#permission">permission</a></strong></code>&
nbsp;</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing fields, and an explanation">
<caption><span>Fields in <a href=".../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a> with type parameters of type <a
href=".../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Field and Description</th>
</tr>
<tbody>
<tr class="altColor">

```

```

<td class="colFirst"><code>static java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">Permission.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#ALL">ALL</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>static java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">Permission.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#NONE">NONE</a></strong></code>&nbsp;</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing methods, and an explanation">
<caption><span>Methods in <a href="../../../../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a> that return <a
href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>static <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></code></td>
<td class="colLast"><span class="strong">Permission.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#valueOf(java.lang.String)">valueOf</a></strong>(java.
lang.String&nbsp;&nbsp;&nbsp;name)</code>
<div class="block">Returns the enum constant of this type with the specified name.</div>
</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>static <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>[]</code></td>
<td class="colLast"><span class="strong">Permission.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#values()">values</a></strong>()</code>
<div class="block">Returns an array containing the constants of this enum type, in
the order they are declared.</div>
</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing methods, and an explanation">
<caption><span>Methods in <a href="../../../../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a> that return types with arguments of type <a
href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>

```

```

<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">DataResource.</span><code><strong><a
href=".../org/apache/cassandra/auth/DataResource.html#applicablePermissions()">applicablePermissions</a
></strong>()</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">FunctionResource.</span><code><strong><a
href=".../org/apache/cassandra/auth/FunctionResource.html#applicablePermissions()">applicablePermissions
</a></strong>()</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">IResource.</span><code><strong><a
href=".../org/apache/cassandra/auth/IResource.html#applicablePermissions()">applicablePermissions</a></s
trong>()</code>
<div class="block">Returns the set of Permissions that may be applied to this resource

```

Certain permissions are not applicable to particular types of resources.</div>

```

</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">RoleResource.</span><code><strong><a
href=".../org/apache/cassandra/auth/RoleResource.html#applicablePermissions()">applicablePermissions</a
></strong>()</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">AllowAllAuthorizer.</span><code><strong><a
href=".../org/apache/cassandra/auth/AllowAllAuthorizer.html#authorize(org.apache.cassandra.auth.Authentic
atedUser,%20org.apache.cassandra.auth.IResource)">authorize</a></strong><(a
href=".../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;<code>&nbsp;<a href=".../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<code>&nbsp;</td>
</tr>

```

```

<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">CassandraAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/CassandraAuthorizer.html#authorize(org.apache.cassandra.auth.Authenti
catedUser,%20org.apache.cassandra.auth.IResource)">authorize</a></strong><(a
href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;user,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">IAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/IAuthorizer.html#authorize(org.apache.cassandra.auth.Authenticat
edUser,%20org.apache.cassandra.auth.IResource)">authorize</a></strong><(a
href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;user,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource)</code>
<div class="block">Returns a set of permissions of a user on a resource.</div>
</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">PermissionsCache.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/PermissionsCache.html#getPermissions(org.apache.cassandra.auth.Auth
enticatedUser,%20org.apache.cassandra.auth.IResource)">getPermissions</a></strong><(a
href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;user,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">AuthenticatedUser.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html#getPermissions(org.apache.cassandra.auth.IRes
ource)">getPermissions</a></strong><(a href="../../../../org/apache/cassandra/auth/IResource.html"
title="interface in org.apache.cassandra.auth">IResource</a>&nbsp;resource)</code>&nbsp;</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing methods, and an explanation">
<caption><span>Method parameters in <a href="../../../../org/apache/cassandra/auth/package-
summary.html">org.apache.cassandra.auth</a> with type arguments of type <a

```



```

href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">AllowAllAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/AllowAllAuthorizer.html#grant(org.apache.cassandra.auth.Authenticated
User,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">gra
nt</a></strong><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;<strong>performer,
    java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;<strong>permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<strong>resource,
    <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;<strong>to)</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">CassandraAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/CassandraAuthorizer.html#grant(org.apache.cassandra.auth.Authenticate
dUser,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">gra
nt</a></strong><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;<strong>performer,
    java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;<strong>permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<strong>resource,
    <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;<strong>grantee)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">IAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/IAuthorizer.html#grant(org.apache.cassandra.auth.AuthenticatedUser,%2
0java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">grant</a></
strong><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;<strong>performer,
    java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;<strong>permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<strong>resource,
    <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;<strong>grantee)</code>

```

```

<div class="block">Grants a set of permissions on a resource to a role.</div>
</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/PermissionDetails.html"
title="class in org.apache.cassandra.auth">PermissionDetails</a>></code></td>
<td class="colLast"><span class="strong">AllowAllAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/AllowAllAuthorizer.html#list(org.apache.cassandra.auth.AuthenticatedU
ser,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">list</
a></strong><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;of)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/PermissionDetails.html"
title="class in org.apache.cassandra.auth">PermissionDetails</a>></code></td>
<td class="colLast"><span class="strong">CassandraAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/CassandraAuthorizer.html#list(org.apache.cassandra.auth.Authenticated
User,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">list
</a></strong><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;grantee)</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>java.util.Set<<a href="../../../../org/apache/cassandra/auth/PermissionDetails.html"
title="class in org.apache.cassandra.auth">PermissionDetails</a>></code></td>
<td class="colLast"><span class="strong">IAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/IAuthorizer.html#list(org.apache.cassandra.auth.AuthenticatedUser,%20j
ava.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">list</a></stro
ng><(a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;grantee)</code>
<div class="block">Returns a list of permissions on a resource granted to a role.</div>

```

```

</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">AllowAllAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/AllowAllAuthorizer.html#revoke(org.apache.cassandra.auth.Authenticat
edUser,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">r
evoke</a></strong><a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;from)</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">CassandraAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/CassandraAuthorizer.html#revoke(org.apache.cassandra.auth.Authenticat
edUser,%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">r
evoke</a></strong><a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;revokee)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">IAuthorizer.</span><code><strong><a
href="../../../../org/apache/cassandra/auth/IAuthorizer.html#revoke(org.apache.cassandra.auth.AuthenticatedUser,
%20java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.RoleResource)">revoke</
a></strong><a href="../../../../org/apache/cassandra/auth/AuthenticatedUser.html" title="class in
org.apache.cassandra.auth">AuthenticatedUser</a>&nbsp;performer,
  java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>>&nbsp;permissions,
  <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;resource,
  <a href="../../../../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;revokee)</code>
<div class="block">Revokes a set of permissions on a resource from a user.</div>
</td>
</tr>
</tbody>
</table>

```

```

<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing constructors, and an explanation">
<caption><span>Constructors in <a href=".../org/apache/cassandra/auth/package-summary.html">org.apache.cassandra.auth</a> with parameters of type <a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colOne" scope="col">Constructor and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colLast"><code><strong><a href=".../org/apache/cassandra/auth/PermissionDetails.html#PermissionDetails(java.lang.String,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.auth.Permission)">PermissionDetails</a></strong>(java.lang.String&nbsp;&nbsp;&nbsp;grantee,
    <a href=".../org/apache/cassandra/auth/IResource.html" title="interface in org.apache.cassandra.auth">IResource</a>&nbsp;&nbsp;&nbsp;resource,
    <a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>&nbsp;&nbsp;&nbsp;permission)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
</tbody>
</table>
</li>
<li class="blockList"><a name="org.apache.cassandra.cql3.statements">
<!-- -->
</a>
<h3>Uses of <a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a> in <a href=".../org/apache/cassandra/cql3/statements/package-summary.html">org.apache.cassandra.cql3.statements</a></h3>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing fields, and an explanation">
<caption><span>Fields in <a href=".../org/apache/cassandra/cql3/statements/package-summary.html">org.apache.cassandra.cql3.statements</a> with type parameters of type <a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Field and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>protected java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><span class="strong">ListPermissionsStatement.</span><code><strong><a href=".../org/apache/cassandra/cql3/statements/ListPermissionsStatement.html#permissions">permissions</a>></strong></code>&nbsp;&nbsp;&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>protected java.util.Set<<a href=".../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>></code></td>

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<td class="colLast"><span class="strong">PermissionsManagementStatement.</span><code><strong><a
href="..../org/apache/cassandra/cql3/statements/PermissionsManagementStatement.html#permissions">permi
ssions</a></strong></code>&nbsp;</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing methods, and an explanation">
<caption><span>Methods in <a href="..../org/apache/cassandra/cql3/statements/package-
summary.html">org.apache.cassandra.cql3.statements</a> with parameters of type <a
href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">AuthenticationStatement.</span><code><strong><a
href="..../org/apache/cassandra/cql3/statements/AuthenticationStatement.html#checkPermission(org.apache.c
assandra.service.ClientState,%20org.apache.cassandra.auth.Permission,%20org.apache.cassandra.auth.RoleResourc
e)">checkPermission</a></strong><(a href="..../org/apache/cassandra/service/ClientState.html" title="class
in org.apache.cassandra.service">ClientState</a>&nbsp;<code>&nbsp;<code>&nbsp;<code>state,
<a href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>&nbsp;<code>&nbsp;<code>&nbsp;<code>required,
<a href="..../org/apache/cassandra/auth/RoleResource.html" title="class in
org.apache.cassandra.auth">RoleResource</a>&nbsp;<code>&nbsp;<code>&nbsp;<code>resource)</code>&nbsp;</td>
</tr>
</tbody>
</table>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing constructors, and an explanation">
<caption><span>Constructor parameters in <a href="..../org/apache/cassandra/cql3/statements/package-
summary.html">org.apache.cassandra.cql3.statements</a> with type arguments of type <a
href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colOne" scope="col">Constructor and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colLast"><code><strong><a
href="..../org/apache/cassandra/cql3/statements/GrantPermissionsStatement.html#GrantPermissionsStatement
(java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.cql3.RoleName)">GrantPermissio
nsStatement</a></strong><(java.util.Set<<a href="..../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>>&nbsp;<code>&nbsp;<code>&nbsp;<code>permissions,
<a href="..../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<code>&nbsp;<code>&nbsp;<code>resource,
<a href="..../org/apache/cassandra/cql3/RoleName.html" title="class in

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org.apache.cassandra.cql3">RoleName</a>&nbsp;&nbsp;&nbsp;grantee)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colLast"><code><strong><a
href="../../../../org/apache/cassandra/cql3/statements/ListPermissionsStatement.html#ListPermissionsStatement(java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.cql3.RoleName,%20boolean)">ListPermissionsStatement</a></strong>(java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>>&nbsp;&nbsp;&nbsp;permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in org.apache.cassandra.auth">IResource</a>&nbsp;&nbsp;&nbsp;resource,
    <a href="../../../../org/apache/cassandra/cql3/RoleName.html" title="class in org.apache.cassandra.cql3">RoleName</a>&nbsp;&nbsp;&nbsp;grantee,
    boolean&nbsp;&nbsp;&nbsp;recursive)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colLast"><code><strong><a
href="../../../../org/apache/cassandra/cql3/statements/PermissionsManagementStatement.html#PermissionsManagementStatement(java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.cql3.RoleName)">PermissionsManagementStatement</a></strong>(java.util.Set<<a
href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>>&nbsp;&nbsp;&nbsp;permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in org.apache.cassandra.auth">IResource</a>&nbsp;&nbsp;&nbsp;resource,
    <a href="../../../../org/apache/cassandra/cql3/RoleName.html" title="class in org.apache.cassandra.cql3">RoleName</a>&nbsp;&nbsp;&nbsp;grantee)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colLast"><code><strong><a
href="../../../../org/apache/cassandra/cql3/statements/RevokePermissionsStatement.html#RevokePermissionsStatement(java.util.Set,%20org.apache.cassandra.auth.IResource,%20org.apache.cassandra.cql3.RoleName)">RevokePermissionsStatement</a></strong>(java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>>&nbsp;&nbsp;&nbsp;permissions,
    <a href="../../../../org/apache/cassandra/auth/IResource.html" title="interface in org.apache.cassandra.auth">IResource</a>&nbsp;&nbsp;&nbsp;resource,
    <a href="../../../../org/apache/cassandra/cql3/RoleName.html" title="class in org.apache.cassandra.cql3">RoleName</a>&nbsp;&nbsp;&nbsp;grantee)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
</tbody>
</table>
</li>
<li class="blockList"><a name="org.apache.cassandra.service">
<!-- -->
</a>
<h3>Uses of <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a> in <a href="../../../../org/apache/cassandra/service/package-summary.html">org.apache.cassandra.service</a></h3>
<table border="0" cellpadding="3" cellspacing="0" summary="Use table, listing methods, and an explanation">
<caption><span>Methods in <a href="../../../../org/apache/cassandra/service/package-

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summary.html">org.apache.cassandra.service</a> with parameters of type <a
href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a></span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tbody>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">ClientState.</span><code><strong><a
href="..../org/apache/cassandra/service/ClientState.html#ensureHasPermission(org.apache.cassandra.auth.Per
mission,%20org.apache.cassandra.cql3.functions.Function)">ensureHasPermission</a></strong><(a
href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>&nbsp;<code>&nbsp;<strong>permission,
<a href="..../org/apache/cassandra/cql3/functions/Function.html" title="interface in
org.apache.cassandra.cql3.functions">Function</a>&nbsp;<code>&nbsp;<strong>function)</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">ClientState.</span><code><strong><a
href="..../org/apache/cassandra/service/ClientState.html#ensureHasPermission(org.apache.cassandra.auth.Per
mission,%20org.apache.cassandra.auth.IResource)">ensureHasPermission</a></strong><(a
href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>&nbsp;<code>&nbsp;<strong>perm,
<a href="..../org/apache/cassandra/auth/IResource.html" title="interface in
org.apache.cassandra.auth">IResource</a>&nbsp;<code>&nbsp;<strong>resource)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">ClientState.</span><code><strong><a
href="..../org/apache/cassandra/service/ClientState.html#hasAllKeyspacesAccess(org.apache.cassandra.auth.P
ermission)">hasAllKeyspacesAccess</a></strong><(a href="..../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>&nbsp;<code>&nbsp;<strong>perm)</code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">ClientState.</span><code><strong><a
href="..../org/apache/cassandra/service/ClientState.html#hasColumnFamilyAccess(java.lang.String,%20java.l
ang.String,%20org.apache.cassandra.auth.Permission)">hasColumnFamilyAccess</a></strong><(java.lang.String&
nbsp;&nbsp;&nbsp;keyspace,
java.lang.String&nbsp;&nbsp;&nbsp;columnFamily,
<a href="..../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>&nbsp;<code>&nbsp;<strong>perm)</code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colFirst"><code>void</code></td>
<td class="colLast"><span class="strong">ClientState.</span><code><strong><a

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href="../../../../org/apache/cassandra/service/ClientState.html#hasKeyspaceAccess(java.lang.String,%20org.apache
.cassandra.auth.Permission)">hasKeyspaceAccess</a></strong>(java.lang.String&nbsp;&nbsp;&nbsp;keyspace,
    <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>&nbsp;&nbsp;&nbsp;perm)</code>&nbsp;&nbsp;&nbsp;</td>
</tr>
</tbody>
</table>
</li>
</ul>
</li>
</ul>
</div>
<!-- ===== START OF BOTTOM NAVBAR ===== -->
<div class="bottomNav"><a name="navbar_bottom">
<!-- -->
</a><a href="#skip-navbar_bottom" title="Skip navigation links"></a><a name="navbar_bottom_firstrow">
<!-- -->
</a>
<ul class="navList" title="Navigation">
<li><a href="../../../../overview-summary.html">Overview</a></li>
<li><a href="../package-summary.html">Package</a></li>
<li><a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Class</a></li>
<li class="navBarCell1Rev">Use</li>
<li><a href="../../../../overview-tree.html">Tree</a></li>
<li><a href="../../../../deprecated-list.html">Deprecated</a></li>
<li><a href="../../../../index-all.html">Index</a></li>
<li><a href="../../../../help-doc.html">Help</a></li>
</ul>
</div>
<div class="subNav">
<ul class="navList">
<li>Prev</li>
<li>Next</li>
</ul>
<ul class="navList">
<li><a href="../../../../index.html?org/apache/cassandra/auth/class-use/Permission.html"
target="_top">Frames</a></li>
<li><a href="Permission.html" target="_top">No Frames</a></li>
</ul>
<ul class="navList" id="allclasses_navbar_bottom">
<li><a href="../../../../allclasses-noframe.html">All Classes</a></li>
</ul>
</div>
<script type="text/javascript"><!--
allClassesLink = document.getElementById("allclasses_navbar_bottom");
if(window==top) {
    allClassesLink.style.display = "block";

```



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}
else {
    allClassesLink.style.display = "none";
}
//-->
</script>
</div>
<a name="skip-navbar_bottom">
<!-- -->
</a></div>
<!-- ===== END OF BOTTOM NAVBAR ===== -->
<p class="legalCopy"><small>Copyright &copy; 2017 The Apache Software Foundation</small></p>
</body>
</html>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<!-- NewPage -->
<html lang="en">
<head>
<!-- Generated by javadoc (version 1.7.0_80) on Thu Sep 28 13:18:58 CDT 2017 -->
<title>Permission (apache-cassandra API)</title>
<meta name="date" content="2017-09-28">
<link rel="stylesheet" type="text/css" href="../../../../stylesheet.css" title="Style">
</head>
<body>
<script type="text/javascript"><!--
    if (location.href.indexOf('is-external=true') == -1) {
        parent.document.title="Permission (apache-cassandra API)";
    }
-->
</script>
<noscript>
<div>JavaScript is disabled on your browser.</div>
</noscript>
<!-- ===== START OF TOP NAVBAR ===== -->
<div class="topNav"><a name="navbar_top">
<!-- -->
</a><a href="#skip-navbar_top" title="Skip navigation links"></a><a name="navbar_top_firstrow">
<!-- -->
</a>
<ul class="navList" title="Navigation">
<li><a href="../../../../overview-summary.html">Overview</a></li>
<li><a href="package-summary.html">Package</a></li>
<li class="navBarCell1Rev">Class</li>
<li><a href="class-use/Permission.html">Use</a></li>
<li><a href="package-tree.html">Tree</a></li>
<li><a href="../../../../deprecated-list.html">Deprecated</a></li>
<li><a href="../../../../index-all.html">Index</a></li>

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<li><a href=" ../../../../help-doc.html">Help</a></li>
</ul>
</div>
<div class="subNav">
<ul class="navList">
<li><a href=" ../../../../org/apache/cassandra/auth/PasswordAuthenticator.html" title="class in
org.apache.cassandra.auth"><span class="strong">Prev Class</span></a></li>
<li><a href=" ../../../../org/apache/cassandra/auth/PermissionDetails.html" title="class in
org.apache.cassandra.auth"><span class="strong">Next Class</span></a></li>
</ul>
<ul class="navList">
<li><a href=" ../../../../index.html?org/apache/cassandra/auth/Permission.html" target="_top">Frames</a></li>
<li><a href="Permission.html" target="_top">No Frames</a></li>
</ul>
<ul class="navList" id="allclasses_navbar_top">
<li><a href=" ../../../../allclasses-noframe.html">All Classes</a></li>
</ul>
</div>
<script type="text/javascript"><!--
allClassesLink = document.getElementById("allclasses_navbar_top");
if(window==top) {
    allClassesLink.style.display = "block";
}
else {
    allClassesLink.style.display = "none";
}
//-->
</script>
</div>
<div>
<ul class="subNavList">
<li>Summary:&nbsp;</li>
<li>Nested&nbsp;&nbsp;&nbsp;</li>
<li><a href="#enum_constant_summary">Enum Constants</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#field_summary">Field</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#method_summary">Method</a></li>
</ul>
<ul class="subNavList">
<li>Detail:&nbsp;</li>
<li><a href="#enum_constant_detail">Enum Constants</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#field_detail">Field</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#method_detail">Method</a></li>
</ul>
</div>
<a name="skip-navbar_top">
<!-- -->
</a></div>
<!-- ===== END OF TOP NAVBAR ===== -->

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<!-- ===== START OF CLASS DATA ===== -->
<div class="header">
<div class="subTitle">org.apache.cassandra.auth</div>
<h2 title="Enum Permission" class="title">Enum Permission</h2>
</div>
<div class="contentContainer">
<ul class="inheritance">
<li>java.lang.Object</li>
<li>
<ul class="inheritance">
<li>java.lang.Enum<<a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>></li>
<li>
<ul class="inheritance">
<li>org.apache.cassandra.auth.Permission</li>
</ul>
</li>
</ul>
</li>
</ul>
</li>
</ul>
<div class="description">
<ul class="blockList">
<li class="blockList">
<dl>
<dt>All Implemented Interfaces:</dt>
<dd>java.io.Serializable, java.lang.Comparable<<a href=" ../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></dd>
</dl>
<hr>
<br>
<pre>public enum <span class="strong">Permission</span>
extends java.lang.Enum<<a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>></pre>
<div class="block">An enum encapsulating the set of possible permissions that an authenticated user can have on a
resource.

IAuthorizer implementations may encode permissions using ordinals, so the Enum order must never change order.
Adding new values is ok.</div>
</li>
</ul>
</div>
<div class="summary">
<ul class="blockList">
<li class="blockList">
<!-- ===== ENUM CONSTANT SUMMARY ===== -->
<ul class="blockList">
<li class="blockList"><a name="enum_constant_summary">
<!-- -->

```

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</a>
<h3>Enum Constant Summary</h3>
<table class="overviewSummary" border="0" cellpadding="3" cellspacing="0" summary="Enum Constant
Summary table, listing enum constants, and an explanation">
<caption><span>Enum Constants</span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colOne" scope="col">Enum Constant and Description</th>
</tr>
<tr class="altColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#ALTER">ALTER</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#AUTHORIZE">AUTHORIZE</a></strong></code>&nb
sp;</td>
</tr>
<tr class="altColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#CREATE">CREATE</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#DESCRIBE">DESCRIBE</a></strong></code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#DROP">DROP</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#EXECUTE">EXECUTE</a></strong></code>&nbsp;</td>
</tr>
<tr class="altColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#MODIFY">MODIFY</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#READ">READ</a></strong></code>
<div class="block"><strong>Deprecated.</strong>&nbsp;</div>
</td>
</tr>
<tr class="altColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#SELECT">SELECT</a></strong></code>&nbsp;</td>

```

```

</tr>
<tr class="rowColor">
<td class="colOne"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#WRITE">WRITE</a></strong></code>
<div class="block"><strong>Deprecated.</strong>&nbsp;</div>
</td>
</tr>
</table>
</li>
</ul>
<!-- ===== FIELD SUMMARY ===== -->
<ul class="blockList">
<li class="blockList"><a name="field_summary">
<!-- -->
</a>
<h3>Field Summary</h3>
<table class="overviewSummary" border="0" cellpadding="3" cellspacing="0" summary="Field Summary table,
listing fields, and an explanation">
<caption><span>Fields</span><span class="tabEnd">&nbsp;</span></caption>
<tr>
<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Field and Description</th>
</tr>
<tr class="altColor">
<td class="colFirst"><code>static java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#ALL">ALL</a></strong></code>&nbsp;</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>static java.util.Set<<a href="../../../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>></code></td>
<td class="colLast"><code><strong><a
href="../../../../org/apache/cassandra/auth/Permission.html#NONE">NONE</a></strong></code>&nbsp;</td>
</tr>
</table>
</li>
</ul>
<!-- ===== METHOD SUMMARY ===== -->
<ul class="blockList">
<li class="blockList"><a name="method_summary">
<!-- -->
</a>
<h3>Method Summary</h3>
<table class="overviewSummary" border="0" cellpadding="3" cellspacing="0" summary="Method Summary table,
listing methods, and an explanation">
<caption><span>Methods</span><span class="tabEnd">&nbsp;</span></caption>
<tr>

```

```

<th class="colFirst" scope="col">Modifier and Type</th>
<th class="colLast" scope="col">Method and Description</th>
</tr>
<tr class="altColor">
<td class="colFirst"><code>static <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a></code></td>
<td class="colLast"><code><strong><a href="../../../../org/apache/cassandra/auth/Permission.html#valueOf(java.lang.String)">valueOf</a></strong>(java.lang.String&nbsp;name)</code>
<div class="block">Returns the enum constant of this type with the specified name.</div>
</td>
</tr>
<tr class="rowColor">
<td class="colFirst"><code>static <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in org.apache.cassandra.auth">Permission</a>[]</code></td>
<td class="colLast"><code><strong><a href="../../../../org/apache/cassandra/auth/Permission.html#values()">values</a></strong>()</code>
<div class="block">Returns an array containing the constants of this enum type, in the order they are declared.</div>
</td>
</tr>
</table>
<ul class="blockList">
<li class="blockList"><a name="methods_inherited_from_class_java.lang.Enum">
<!-- -->
</a>
<h3>Methods inherited from class java.lang.Enum</h3>
<code>clone, compareTo, equals, finalize, getDeclaringClass, hashCode, name, ordinal, toString, valueOf</code></li>
</ul>
<ul class="blockList">
<li class="blockList"><a name="methods_inherited_from_class_java.lang.Object">
<!-- -->
</a>
<h3>Methods inherited from class java.lang.Object</h3>
<code>getClass, notify, notifyAll, wait, wait, wait</code></li>
</ul>
</li>
</ul>
</li>
</ul>
</div>
<div class="details">
<ul class="blockList">
<li class="blockList">
<!-- ===== ENUM CONSTANT DETAIL ===== -->
<ul class="blockList">
<li class="blockList"><a name="enum_constant_detail">

```

```

<!-- -->
</a>
<h3>Enum Constant Detail</h3>
<a name="READ">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>READ</h4>
<pre>@Deprecated
public static final <a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> READ</pre>
<div class="block"><span class="strong">Deprecated.</span>&nbsp;</div>
</li>
</ul>
<a name="WRITE">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>WRITE</h4>
<pre>@Deprecated
public static final <a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> WRITE</pre>
<div class="block"><span class="strong">Deprecated.</span>&nbsp;</div>
</li>
</ul>
<a name="CREATE">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>CREATE</h4>
<pre>public static final <a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> CREATE</pre>
</li>
</ul>
<a name="ALTER">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>ALTER</h4>
<pre>public static final <a href=" ../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> ALTER</pre>
</li>
</ul>
<a name="DROP">

```

```

<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>DROP</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> DROP</pre>
</li>
</ul>
<a name="SELECT">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>SELECT</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> SELECT</pre>
</li>
</ul>
<a name="MODIFY">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>MODIFY</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> MODIFY</pre>
</li>
</ul>
<a name="AUTHORIZE">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>AUTHORIZE</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> AUTHORIZE</pre>
</li>
</ul>
<a name="DESCRIBE">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>DESCRIBE</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> DESCRIBE</pre>
</li>

```



```

</ul>
<a name="EXECUTE">
<!-- -->
</a>
<ul class="blockListLast">
<li class="blockList">
<h4>EXECUTE</h4>
<pre>public static final <a href="../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a> EXECUTE</pre>
</li>
</ul>
</li>
</ul>
<!-- ===== FIELD DETAIL ===== -->
<ul class="blockList">
<li class="blockList"><a name="field_detail">
<!-- -->
</a>
<h3>Field Detail</h3>
<a name="ALL">
<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>ALL</h4>
<pre>public static final java.util.Set<<a href="../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>> ALL</pre>
</li>
</ul>
<a name="NONE">
<!-- -->
</a>
<ul class="blockListLast">
<li class="blockList">
<h4>NONE</h4>
<pre>public static final java.util.Set<<a href="../../org/apache/cassandra/auth/Permission.html"
title="enum in org.apache.cassandra.auth">Permission</a>> NONE</pre>
</li>
</ul>
</li>
</ul>
<!-- ===== METHOD DETAIL ===== -->
<ul class="blockList">
<li class="blockList"><a name="method_detail">
<!-- -->
</a>
<h3>Method Detail</h3>
<a name="values()">

```

```

<!-- -->
</a>
<ul class="blockList">
<li class="blockList">
<h4>values</h4>
<pre>public static   <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>[]   values()</pre>
<div class="block">Returns an array containing the constants of this enum type, in
the order they are declared. This method may be used to iterate
over the constants as follows:
<pre>
for (Permission c : Permission.values())
     System.out.println(c);
</pre></div>
<dl><dt><span class="strong">Returns:</span></dt><dd>an array containing the constants of this enum type, in
the order they are declared</dd></dl>
</li>
</ul>
<a name="valueOf(java.lang.String)">
<!-- -->
</a>
<ul class="blockListLast">
<li class="blockList">
<h4>valueOf</h4>
<pre>public static   <a href="../../../../org/apache/cassandra/auth/Permission.html" title="enum in
org.apache.cassandra.auth">Permission</a>   valueOf(java.lang.String   name)</pre>
<div class="block">Returns the enum constant of this type with the specified name.
The string must match <i>exactly</i> an identifier used to declare an
enum constant in this type. (Extraneous whitespace characters are
not permitted.)</div>
<dl><dt><span class="strong">Parameters:</span></dt><dd><code>name</code> - the name of the enum constant
to be returned.</dd>
<dt><span class="strong">Returns:</span></dt><dd>the enum constant with the specified name</dd>
<dt><span class="strong">Throws:</span></dt>
<dd><code>java.lang.IllegalArgumentException</code> - if this enum type has no constant with the specified
name</dd>
<dd><code>java.lang.NullPointerException</code> - if the argument is null</dd></dl>
</li>
</ul>
</li>
</ul>
</li>
</ul>
</div>
</div>
<!-- ===== END OF CLASS DATA ===== -->
<!-- ===== START OF BOTTOM NAVBAR ===== -->
<div class="bottomNav"><a name="navbar_bottom">

```

```

<!-- -->
</a><a href="#skip-navbar_bottom" title="Skip navigation links"></a><a name="navbar_bottom_firstrow">
<!-- -->
</a>
<ul class="navList" title="Navigation">
<li><a href="../../overview-summary.html">Overview</a></li>
<li><a href="package-summary.html">Package</a></li>
<li class="navBarCell1Rev">Class</li>
<li><a href="class-use/Permission.html">Use</a></li>
<li><a href="package-tree.html">Tree</a></li>
<li><a href="../../deprecated-list.html">Deprecated</a></li>
<li><a href="../../index-all.html">Index</a></li>
<li><a href="../../help-doc.html">Help</a></li>
</ul>
</div>
<div class="subNav">
<ul class="navList">
<li><a href="../../org/apache/cassandra/auth/PasswordAuthenticator.html" title="class in org.apache.cassandra.auth"><span class="strong">Prev Class</span></a></li>
<li><a href="../../org/apache/cassandra/auth/PermissionDetails.html" title="class in org.apache.cassandra.auth"><span class="strong">Next Class</span></a></li>
</ul>
<ul class="navList">
<li><a href="../../index.html?org/apache/cassandra/auth/Permission.html" target="_top">Frames</a></li>
<li><a href="Permission.html" target="_top">No Frames</a></li>
</ul>
<ul class="navList" id="allclasses_navbar_bottom">
<li><a href="../../allclasses-noframe.html">All Classes</a></li>
</ul>
</div>
<script type="text/javascript"><!--
allClassesLink = document.getElementById("allclasses_navbar_bottom");
if(window==top) {
    allClassesLink.style.display = "block";
}
else {
    allClassesLink.style.display = "none";
}
//-->
</script>
</div>
<div>
<ul class="subNavList">
<li>Summary:&nbsp;</li>
<li>Nested&nbsp;&nbsp;&nbsp;</li>
<li><a href="#enum_constant_summary">Enum Constants</a>&nbsp;&nbsp;&nbsp;</li>
<li><a href="#field_summary">Field</a>&nbsp;&nbsp;&nbsp;</li>
<li><a href="#method_summary">Method</a></li>

```

```

</ul>
<ul class="subNavList">
<li>Detail:&nbsp;&nbsp;&nbsp;</li>
<li><a href="#enum_constant_detail">Enum Constants</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#field_detail">Field</a>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</li>
<li><a href="#method_detail">Method</a></li>
</ul>
</div>
<a name="skip-navbar_bottom">
<!-- -->
</a></div>
<!-- ===== END OF BOTTOM NAVBAR ===== -->
<p class="legalCopy"><small>Copyright &copy; 2017 The Apache Software Foundation</small></p>
</body>
</html>

```

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8.3 curl 7.19.7

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8.4 curl 7.35

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/*****

*

* This example source code introduces a c library buffered I/O interface to
* URL reads it supports fopen(), fread(), fgets(), feof(), fclose(),
* rewind(). Supported functions have identical prototypes to their normal c
* lib namesakes and are preceeded by url_ .

*

* Using this code you can replace your program's fopen() with url_fopen()
* and fread() with url_fread() and it become possible to read remote streams
* instead of (only) local files. Local files (ie those that can be directly
* fopened) will drop back to using the underlying clib implementations

*

* See the main() function at the bottom that shows an app that retrieves from a
* specified url using fgets() and fread() and saves as two output files.

*

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*

* Re-implemented by Vincent Sanders <vince@kyllikki.org> with extensive
* reference to original curl example code

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*
* This example requires libcurl 7.9.7 or later.
*/
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8.5 curl 7.19.7

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```
<one line to give the program's name and a brief idea of what it does.>  
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```

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8.10 ntp 4.2.8p4

8.10.1 Available under license :

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4. [4]Viraj Bais <vbais@mailman1.intel.com> and [5]Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
5. [6]Michael Barone <michael,barone@lmco.com> GPSVME fixes
6. [7]Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
7. [8]Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.
8. [9]Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver
9. [10]Piete Brooks <Piete.Brooks@cl.cam.ac.uk> MSF clock driver, Trimble PARSE support
10. [11]Nelson B Bolyard <nelson@bolyard.me> update and complete broadcast and crypto features in sntp
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13. [14]Steve Clift <clift@ml.csiro.au> OMEGA clock driver
14. [15]Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration
15. [16]Sven Dietrich <sven_dietrich@trimble.com> Palisade reference clock driver, NT adj. residuals, integrated Greg's Winnt port.
16. [17]John A. Dundas III <dundas@salt.jpl.nasa.gov> Apple A/UX port
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18. [19]Dennis Ferguson <dennis@mrbill.canet.ca> foundation code for NTP Version 2 as specified in RFC-1119
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27. [29]Poul-Henning Kamp <phk@FreeBSD.ORG> Oncore driver (Original author)
28. [30]Frank Kardel [31]<kardel (at) ntp (dot) org> PARSE <GENERIC> (driver 14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup, dynamic interface handling
29. [32]Johannes Maximilian Kuehn <kuehn@ntp.org> Rewrote sntp to comply with NTPv4 specification, ntpq saveconfig
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34. [37]Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication
35. [38]Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305
36. [39]Danny Mayer <mayer@ntp.org>Network I/O, Windows Port, Code Maintenance
37. [40]David L. Mills <mills@udel.edu> Version 4 foundation, precision kernel; clock drivers: 1, 3, 4, 6, 7, 11, 13, 18, 19, 22, 36
38. [41]Wolfgang Moeller <moeller@gwdgv1.dnet.gwdg.de> VMS port
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40. [43]Tom Moore <tmoore@fieval.daytonoh.ncr.com> i386 svr4 port
41. [44]Kamal A Mostafa <kamal@whence.com> SCO OpenServer port
42. [45]Derek Mulcahy <derek@toybox.demon.co.uk> and [46]Damon Hart-Davis <d@hd.org> ARCRON MSF clock driver
43. [47]Rob Neal <neal@ntp.org> Bancomm refclock and config/parse code maintenance
44. [48]Rainer Pruy <Rainer.Pruy@informatik.uni-erlangen.de> monitoring/trap scripts, statistics file handling
45. [49]Dirce Richards <dirce@zk3.dec.com> Digital UNIX V4.0 port
46. [50]Wilfredo Sanchez <wsanchez@apple.com> added support for NetInfo
47. [51]Nick Sayer <mrapple@quack.kfu.com> SunOS streams modules
48. [52]Jack Sasportas <jack@innovativeinternet.com> Saved a Lot of space on the stuff in the html/pic/ subdirectory
49. [53]Ray Schnitzler <schnitz@unipress.com> Unixware1 port
50. [54]Michael Shields <shields@tembel.org> USNO clock driver
51. [55]Jeff Steinman <jss@pebbles.jpl.nasa.gov> Datum PTS clock driver
52. [56]Harlan Stenn <harlan@pfcs.com> GNU automake/autoconfigure makeover, various other bits (see the ChangeLog)
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57. [61]Loganaden Velvindron <loganaden@gmail.com> Sandboxing (libseccomp) support
58. [62]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver
59. [63]Ulrich Windl <Ulrich.Windl@rz.uni-regensburg.de> corrected and validated HTML documents according to the HTML DTD

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```
/* -*- Mode: Text -*- */
```

```
copyright = {  
  date = "1992-2015";  
  owner = "The University of Delaware and Network Time Foundation";  
  eaddr = "http://bugs.ntp.org, bugs@ntp.org";  
  type = ntp;  
};
```

```
long-opts;  
config-header = config.h;  
environrc;  
no-misuse-usage;  
version-proc = ntpOptionPrintVersion;
```

```
version      = `  
eval VERSION=`sed -e 's/.*,\\[// -e 's/\\.*/' < ../sntp/m4/version.m4`  
[ -z "${VERSION}" ] && echo "Cannot determine VERSION" && kill -TERM $AG_pid  
echo $VERSION`;
```

```
version-value = "; /* Don't use -v as a shortcut for --version */
```

```
/*
```

```
* HMS: man pages already have this, and texi pages can use the  
* values in sntp/include/version.texi .
```

```
*/
```

```
// doc-sub = {
```



```

// sub-name = version;
// sub-text = 's/#VERSION#/<<version>>/g';
// };
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<head>
<meta http-equiv="content-type" content="text/html;charset=iso-8859-1">
<title>Copyright Notice</title>
<!-- Changed by: Harlan Stenn, 10-Mar-2014 -->
<link href="scripts/style.css" type="text/css" rel="stylesheet">
</head>
<body>
<h3>Copyright Notice</h3>
 "Clone me," says Dolly sheepishly.
<p>Last update:
<!-- #BeginDate format:En2m -->17-Jan-2015 00:16<!-- #EndDate -->
  UTC</p>
<br clear="left">
</p>
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- Mark Andrews <mark_andrews@isc.org> Leitch atomic clock controller
- Bernd Altmeier <altmeier@atsoft.de> hopf Elektronik serial line and PCI-bus devices
- Viraj Bais <vbais@mailman1.intel.com> and Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
- Michael Barone <michael,barone@lmco.com> GPSVME fixes
- Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
- Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.
- Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver
- Piete Brooks <Piete.Brooks@cl.cam.ac.uk> MSF clock driver, Trimble PARSE support

- Nelson B Bolyard <nelson@bolyard.me> update and complete broadcast and crypto features in sntp
- Jean-Francois Boudreault <Jean-Francois.Boudreault@viagenie.qc.ca> IPv6 support
- Reg Clemens <reg@dwf.com> Oncore driver (Current maintainer)
- Steve Clift <clift@ml.csiro.au> OMEGA clock driver
- Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration
- Sven Dietrich <sven_dietrich@trimble.com> Palisade reference clock driver, NT adj. residuals, integrated Greg's Winnt port.
- John A. Dundas III <dundas@salt.jpl.nasa.gov> Apple A/UX port
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- Glenn Hollinger <glenn@herald.usask.ca> GOES clock driver
- Mike Iglesias <iglesias@uci.edu> DEC Alpha port
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- Poul-Henning Kamp <phk@FreeBSD.ORG> Oncore driver (Original author)
- Frank Kardel <kardel (at) ntp (dot) org> PARSE <GENERIC> (driver 14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup, dynamic interface handling
- Johannes Maximilian Kuehn <kuehn@ntp.org> Rewrote <tt>sntp</tt> to comply with NTPv4 specification, <tt>ntp saveconfig</tt>
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- George Lindholm <lindholm@ucs.ubc.ca> SunOS 5.1 port
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29. [32]Johannes Maximilian Kuehn <kuehn@ntp.org> Rewrote sntp to comply with NTPv4 specification, ntpq saveconfig
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44. [48]Rainer Pruy <Rainer.Pruy@informatik.uni-erlangen.de> monitoring/trap scripts, statistics file handling
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46. [50]Wilfredo Sánchez <wsanchez@apple.com> added support for NetInfo
47. [51]Nick Sayer <mrapple@quack.kfu.com> SunOS streams modules
48. [52]Jack Sasportas <jack@innovativeinternet.com> Saved a Lot of space on the stuff in the html/pic/ subdirectory
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 58. [62]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver
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8.12 openssl 1.0.2f

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

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| 1.3 thru 1.5.2 | 1.2 | 1995-1999 | CNRI | yes |

| | | | | |
|---------------|-----------|----------|------------|---------|
| 1.6 | 1.5.2 | 2000 | CNRI | no |
| 2.0 | 1.6 | 2000 | BeOpen.com | no |
| 1.6.1 | 1.6 | 2001 | CNRI | yes (2) |
| 2.1 | 2.0+1.6.1 | 2001 | PSF | no |
| 2.0.1 | 2.0+1.6.1 | 2001 | PSF | yes |
| 2.1.1 | 2.1+2.0.1 | 2001 | PSF | yes |
| 2.1.2 | 2.1.1 | 2002 | PSF | yes |
| 2.1.3 | 2.1.2 | 2002 | PSF | yes |
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8.16 python 2.7.12 2.7.12-1ubuntu0~16.04.3

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| 1.6 | 1.5.2 | 2000 | CNRI | no |
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| 1.6.1 | 1.6 | 2001 | CNRI | yes (2) |
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History and License

History of the software

=====

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <https://www.cnri.reston.va.us/>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation; see <http://www.zope.com/>). In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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| 2.1 | 2.0+1.6.1 | 2001 | PSF | no |
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Mersenne Twister

The `:mod:`_random`` module includes code based on a download from <http://www.math.sci.hiroshima-u.ac.jp/~m-mat/MT/MT2002/emt19937ar.html>. The following are the verbatim comments from the original code::

A C-program for MT19937, with initialization improved 2002/1/26.
Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using `init_genrand(seed)`
or `init_by_array(init_key, key_length)`.

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<http://www.math.sci.hiroshima-u.ac.jp/~m-mat/MT/emt.html>

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Sockets

The `:mod:`socket`` module uses the functions, `:func:`getaddrinfo``, and `:func:`getnameinfo``, which are coded in separate source files from the WIDE Project, <http://www.wide.ad.jp/>. ::

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MD5 message digest algorithm

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L. Peter Deutsch
ghost@aladdin.com

Independent implementation of MD5 (RFC 1321).

This code implements the MD5 Algorithm defined in RFC 1321, whose text is available at

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The code is derived from the text of the RFC, including the test suite (section A.5) but excluding the rest of Appendix A. It does not include any code or documentation that is identified in the RFC as being copyrighted.

The original and principal author of md5.h is L. Peter Deutsch <ghost@aladdin.com>. Other authors are noted in the change history that follows (in reverse chronological order):

2002-04-13 lpd Removed support for non-ANSI compilers; removed references to Ghostscript; clarified derivation from RFC 1321; now handles byte order either statically or dynamically.
1999-11-04 lpd Edited comments slightly for automatic TOC extraction.
1999-10-18 lpd Fixed typo in header comment (ansi2knr rather than md5); added conditionalization for C++ compilation from Martin Purschke <purschke@bnl.gov>.
1999-05-03 lpd Original version.

Asynchronous socket services

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UUencode and UUdecode functions

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Modified by Jack Jansen, CWI, July 1995:

- Use `binascii` module to do the actual line-by-line conversion between ascii and binary. This results in a 1000-fold speedup. The C version is still 5 times faster, though.

- Arguments more compliant with Python standard

XML Remote Procedure Calls

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`test_epoll`

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strtod and dtoa

The file `:file:`Python/dtoa.c``, which supplies C functions `dtoa` and

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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9.5 coverage 4.4.2

9.5.1 Available under license :

Coverage.py was originally written by Gareth Rees, and since 2004 has been extended and maintained by Ned Batchelder.

Other contributions, including writing code, updating docs, and submitting useful bug reports, have been made by:

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9.7 dnspython 1.15.0

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9.10 enum34 1.1.6

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9.16 ming 0.5.5

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9.18 mongomock 3.8.0

9.19 moto 1.1.23

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9.24 passlib 1.7.1

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Special thanks to Darin Gordon for testing and feedback on the `:mod:`passlib.totp`` module.

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converted to python May 2008

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UnixCrypt.java 0.9 96/11/25

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modified April 2001

by Iris Van den Broeke, Daniel Deville

modified Aug 2005

by Greg Wilkins (gregw)

converted to python Jun 2009

by Eli Collins

jBCrypt

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9.25 pbr 1.8.1

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9.26 Portalocker 0.5.6

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9.28 pyelliptic 1.5.8

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9.29 pymongo 2.8

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9.30 PyNaCl 1.2.0

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9.32 python-acme 0.25.1

9.33 python-cinderclient 3.2.0

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=====
CINDERCLIENT Tests
=====

Functional Tests
=====

Cinderclient contains a suite of functional tests, in the cinderclient/
tests/functional directory.

These are currently non-voting, meaning that Jenkins will not reject a
patched based on failure of the functional tests. It is highly recommended,
however, that these tests are investigated in the case of a failure.

Running the tests

Run the tests using tox, which calls ostestr via the tox.ini file. To run all
tests simply run::

```
tox -e functional
```

This will create a virtual environment, load all the packages from
test-requirements.txt and run all unit tests as well as run flake8 and hacking

checks against the code.

Note that you can inspect the tox.ini file to get more details on the available options and what the test run does by default.

Running a subset of tests using tox

One common activity is to just run a single test, you can do this with tox simply by specifying to just run py27 or py34 tests against a single test::

```
tox -e functional -- -n cinderclient.tests.functional.test_readonly_cli.CinderClientReadOnlyTests.test_list
```

Or all tests in the test_readonly_clitest_readonly_cli.py file::

```
tox -e functional -- -n cinderclient.tests.functional.test_readonly_cli
```

For more information on these options and how to run tests, please see the `ostestr` documentation <<https://docs.openstack.org/os-testr/latest/>>`_.

Gotchas

The cinderclient.tests.functional.test_cli.CinderBackupTests.test_backup_create_and_delete test will fail in Devstack without c-bak service running, which requires Swift.

Make sure Swift is enabled when you stack.sh by putting this in local.conf :

```
enable_service s-proxy s-object s-container s-account
```

=====
CINDERCLIENT Tests

=====
Unit Tests

=====
Cinderclient contains a suite of unit tests, in the cinderclient/tests/unit directory.

Any proposed code change will be automatically rejected by the OpenStack Jenkins server [#f1]_ if the change causes unit test failures.

Running the tests

There are a number of ways to run unit tests currently, and there's a combination of frameworks used depending on what commands you use. The preferred method is to use tox, which calls ostestr via the tox.ini file.

To run all tests simply run::

```
tox
```

This will create a virtual environment, load all the packages from test-requirements.txt and run all unit tests as well as run flake8 and hacking checks against the code.

Note that you can inspect the tox.ini file to get more details on the available options and what the test run does by default.

Running a subset of tests using tox

One common activity is to just run a single test, you can do this with tox simply by specifying to just run py27 or py34 tests against a single test::

```
tox -epy27 -- -n cinderclient.tests.unit.v2.test_volumes.VolumesTest.test_attach
```

Or all tests in the test_volumes.py file::

```
tox -epy27 -- -n cinderclient.tests.unit.v2.test_volumes
```

For more information on these options and how to run tests, please see the `ostestr` documentation <<https://docs.openstack.org/os-testr/latest/>>`_.

Run tests wrapper script

In addition you can also use the wrapper script run_tests.sh by simply executing::

```
./run_tests.sh
```

This script is a wrapper around the testr testrunner and the flake8 checker. Note that there has been talk around deprecating this wrapper and this method of testing, it's currently available still but it may be good to get used to using tox or even ostestr directly.

Documenation is left in place for those that still use it.

Flags

The ``run_tests.sh`` script supports several flags. You can view a list of flags by doing::

```
run_tests.sh -h
```

This will show the following help information::

```
Usage: ./run_tests.sh [OPTION]...  
Run cinderclient's test suite(s)
```

-V, --virtual-env Always use virtualenv. Install automatically if not present
 -N, --no-virtual-env Don't use virtualenv. Run tests in local environment
 -s, --no-site-packages Isolate the virtualenv from the global Python environment
 -r, --recreate-db Recreate the test database (deprecated, as this is now the default).
 -n, --no-recreate-db Don't recreate the test database.
 -f, --force Force a clean re-build of the virtual environment. Useful when dependencies have been added.
 -u, --update Update the virtual environment with any newer package versions
 -p, --pep8 Just run PEP8 and HACKING compliance check
 -P, --no-pep8 Don't run static code checks
 -c, --coverage Generate coverage report
 -d, --debug Run tests with testtools instead of testr. This allows you to use the debugger.
 -h, --help Print this usage message
 --hide-elapsed Don't print the elapsed time for each test along with slow test list
 --virtual-env-path <path> Location of the virtualenv directory
 Default: \$(pwd)
 --virtual-env-name <name> Name of the virtualenv directory
 Default: .venv
 --tools-path <dir> Location of the tools directory
 Default: \$(pwd)

Note: with no options specified, the script will try to run the tests in a virtual environment, If no virtualenv is found, the script will ask if you would like to create one. If you prefer to run tests NOT in a virtual environment, simply pass the -N option.

Because ``run_tests.sh`` is a wrapper around testr, it also accepts the same flags as testr. See the documentation for details about these additional flags:
 `ostestr documentation <<https://docs.openstack.org/os-testr/latest/>>` _.

.. _nose options documentation: <http://readthedocs.org/docs/nose/en/latest/usage.html#options>

Suppressing logging output when tests fail

By default, when one or more unit test fails, all of the data sent to the logger during the failed tests will appear on standard output, which typically consists of many lines of texts. The logging output can make it difficult to identify which specific tests have failed, unless your terminal has a large scrollbar buffer or you have redirected output to a file.

You can suppress the logging output by calling ``run_tests.sh`` with the nose flag::

```
--nologcapture
```

Virtualenv

By default, the tests use the Python packages installed inside a virtualenv [#f2]_. (This is equivalent to using the ``-V, --virtualenv`` flag). If the virtualenv does not exist, it will be created the first time the tests are run.

If you wish to recreate the virtualenv, call ``run_tests.sh`` with the flag::

```
-f, --force
```

Recreating the virtualenv is useful if the package dependencies have changed since the virtualenv was last created. If the ``requirements.txt`` or ``tools/install_venv.py`` files have changed, it's a good idea to recreate the virtualenv.

By default, the unit tests will see both the packages in the virtualenv and the packages that have been installed in the Python global environment. In some cases, the packages in the Python global environment may cause a conflict with the packages in the virtualenv. If this occurs, you can isolate the virtualenv from the global environment by using the flag::

```
-s, --no-site packages
```

If you do not wish to use a virtualenv at all, use the flag::

```
-N, --no-virtual-env
```

Gotchas

****Running Tests from Shared Folders****

If you are running the unit tests from a shared folder, you may see tests start to fail or stop completely as a result of Python lockfile issues. You can get around this by manually setting or updating the following line in ``cinder/tests/conf_fixture.py``:

```
CONF['lock_path'].SetDefault('/tmp')
```

Note that you may use any location (not just ``/tmp``!) as long as it is not a shared folder.

.. rubric:: Footnotes

.. [#f1] See :doc:`jenkins`.

.. [#f2] See :doc:`development.environment` for more details about the use of virtualenv.

9.34 python-httpplib2 0.10.3

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9.35 python-keyring 9.1

9.36 python-ndg-httpsclient 0.4.3

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9.37 python-novaclient 2.27.0

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9.38 python-pyopenssl 17.3.0

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9.39 python-vagrant 0.5.15

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9.40 PyYAML 3.12

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9.41 rackspace-neutronclient 1.1

9.42 requests-mock 1.4.0

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9.43 retry 0.9.2

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9.44 ws4py 0.3.5

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9.45 xunitparser 1.3.3

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